

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF OHIO
EASTERN DIVISION**

IN RE NATIONAL PRESCRIPTION OPIATE)
LITIGATION)
)
This document relates to:)
) MDL No. 2804
The County of Summit, Ohio, et al. v. Purdue)
Pharma L.P., et al., Case No. 18-op-45090) Hon. Dan Aaron Polster
)
The County of Cuyahoga, Ohio, et al. v. Purdue)
Pharma L.P., et al., Case No. 17-op-45004)
)
)
)

**Expert Report of Heath A. Jolliff, D.O.
May 10, 2019**

I. Introduction*

- A. I, Heath A. Jolliff, DO, am a board-certified Medical Toxicologist and Emergency Medicine physician duly licensed to practice medicine in the states of Colorado and Ohio.
- B. I am an independent contractor and I am paid an hourly rate to review documents and render medical opinions regarding the documents contained herein. I do not receive additional compensation in the form of bonuses or incentive pay of any kind. My compensation does not depend upon the outcome of my reviews, the substance of my medical opinions, or any factor other than the number of hours it takes to review a case and provide an analysis.
- C. No counsel for defendants has ever expressed to me any requirements or expectations regarding the ultimate conclusions or opinions I provide other than that I provide a well-reasoned professional opinion based on thorough review of all relevant and available information. Neither my compensation or any continued professional relationship with defense counsel, are contingent in any way on the ultimate conclusions or opinions that I provide.
- D. Defense counsel has asked that I give my opinions regarding the following:
 - 1. Are there any known risk factors associated with addiction that should be considered when prescribing opioid medications?
 - 2. Are there any known risk factors associated with overdose that should be considered when prescribing opioid medications?

* I understand that my opinions will be offered on behalf of distributor defendants McKesson Corporation, AmerisourceBergen Drug Corporation, and Cardinal Health, Inc. in this consolidated action.

3. From the perspective of a practicing physician and medical toxicologist in the state of Ohio, what patterns have occurred in Ohio in regard to unintentional drug overdoses and opioid medication deaths?

E. My fee schedule is attached as Addendum A.

II. Background and Qualifications

A. I have been a Clinical Professor of Emergency Medicine at the Ohio University Heritage College of Osteopathic Medicine in Athens, Ohio since 2002.

B. I have been the Associate Program Director for the Emergency Medicine Residency Program at Adena Regional Medical Center in Chillicothe, Ohio since 2015.

C. I am the founder of and a medical toxicologist at Mid-Ohio Toxicology Services, LLC in Columbus, Ohio since 2001.

D. I have been a consulting medical toxicologist at Doctors Hospital-OhioHealth in Columbus, Ohio since 2002.

III. Education

A. I received my Bachelor of Arts (B.A.) in Biomedical Sciences at Wright State University in Dayton, Ohio in 1988.

B. I received my Doctor of Osteopathy (D.O.) at Ohio University College of Osteopathic Medicine in Athens, Ohio in 1993.

- C. I completed an internship in Internal Medicine at Grandview Hospital and Medical Center in Dayton, Ohio in 1994.
- D. I completed a residency in Emergency Medicine at Grandview Hospital and Medical Center in Dayton, Ohio in 1997.
- E. I have been Board Certified in Emergency Medicine since 2000.
- F. I completed a fellowship in Medical Toxicology at the University of Colorado Health Sciences Center/Rocky Mountain Drug and Poison Center in Denver, Colorado in 2002.
- G. I have been Board Certified in Medical Toxicology since 2007.

IV. Specialty Practice and Awards

- A. For more than 25 years, I have treated both acute and chronic illness in pediatric, adolescent, adult and geriatric patients in Emergency Departments and Trauma Centers in Ohio and Colorado. These patients include those in pain from traumatic injuries and chronic illness, those with alcohol addiction, drug addiction and withdrawal, and those patients with drug intoxication and overdose.
- B. As a medical toxicologist, my practice centers on the prevention of poisoning in the home and the workplace, the prevention of adverse drug effects and drug interactions, patient medication safety, evaluating and treating patients who are poisoned or potentially poisoned, treating patients who abuse alcohol and multiple drugs of abuse, treating patients with acute life-threatening overdoses

from various medications including prescription and non-prescription opiates and opioids, and the forensic evaluation of persons who have died from overdose and poisoning.

- C. I have been licensed to practice medicine in the state of Ohio since 1993 and in the state of Colorado since 2001.
- D. I obtained my Drug Enforcement Agency (DEA) "X-waiver" in 2008, to allow me to prescribe buprenorphine and buprenorphine/haloxone to patients with opioid and opiate addiction and withdrawal.
- E. I have presented more than 300 lectures on various topics in Emergency Medicine and Medical Toxicology including alcohol, drugs of abuse, poisoning, drug overdose, medication safety and forensic toxicology at the local, state, national and international levels.
- F. I have authored, co-authored or presented more than 50 medical journal articles, medical textbook chapters and academic conference presentations in the field of Medical Toxicology and Emergency Medicine.
- G. I have been a content editor and manuscript reviewer for multiple medical journals and medical databases including *The Journal of Pediatrics*, *The Journal of Medical Toxicology*, *Clinical Toxicology*, *The Western Journal of Emergency Medicine* and the *Lexi-Tox/Lexi-Comp* toxicology database.
- H. I have been a subject matter expert and reviewer for the Medical Toxicology Board Examination for the American Osteopathic Board of Emergency Medicine since 2018.

- I. I received Fellow status from the American College of Medical Toxicology in 2012, the American Academy of Emergency Medicine in 2007 and the American College of Emergency Medicine in 2004.
- J. I have received multiple awards for teaching and clinical practice in Emergency Medicine and Medical Toxicology: the M.D. Carter Award (1993), Outstanding Emergency Medicine Faculty Award (2004), Outstanding Service Award (2007), Outstanding Preceptor Award (2010-2011), Educator of the Year Award (2015-2016) and the EM:RAP Challenge Coin Award for Excellence in Humanity & Emergency Medicine (2019).
- K. In 2010, I was appointed to Ohio Governor John Kasich's *Ohio Prescription Drug Abuse Task Force* and in 2011 – 2013 was appointed to Governor Kasich's *Governor's Cabinet Opiate Action Team (GCOAT)* to create prescribing guidelines for opioids and controlled substances in the treatment of acute and chronic pain in Ohio's Emergency Departments and acute care facilities.
- L. My CV is attached as Addendum B.

V. Opiates and Opioids

- A. Opiates are drugs that are derived from opium, which is an extract of the poppy plants *Papaver somniferum* and *P. album*.¹
 - 1. Derivatives of opium are drugs and medications such as morphine, codeine and heroin.
- B. Opioids are similar to opiates but are synthetic or semi-synthetic drugs.

1. Synthetic opioids include meperidine, methadone and fentanyl.
2. Semi-synthetic opioids include hydrocodone, hydromorphone, oxycodone and buprenorphine.

C. For the purposes of this report, unless otherwise noted, I will refer to opiates and opioids as opioid medications.

D. These medications can be administered by several routes: oral, parenteral, intranasal, rectal, intrathecal and transdermal.

E. The most common clinical application for the use of opioid medication is in the treatment of acute or chronic pain.

1. However, there are also some clinical uses that are non-analgesic, such as the antitussive effects of codeine and hydrocodone, the anti-diarrheal effects of loperamide, the use of morphine for the alleviation of dyspnea in left-sided heart failure and the use of fentanyl as an adjunct to anesthesia and sedation.

F. Opioid medications bind to specific receptors in the brain.² The primary receptor of interest is the mu receptor (μ). The binding at these receptors causes the analgesic effects of opioid medications. However, these receptors are also located in the spine and at peripheral levels.

G. For the purposes of this discussion, I will focus on five major opioid medications (morphine, fentanyl, hydrocodone, oxycodone, and methadone) and one non-medicinal opiate (heroin).

H. Common Dosing of Opioid Medications ^{3,4}

Drug	Equianalgesic Oral Dose	Equianalgesic IV Dose	Adult Starting Dose (PO)	Adult Starting Dose (IV)
Morphine	30 mg	10 mg	15 mg	5 mg
Fentanyl	N/A	0.2 mg	N/A	0.05 mg
Hydrocodone	30 mg	N/A	5 mg	N/A
Oxycodone	20 mg	N/A	5 mg	N/A
Methadone*	7.5 mg	N/A	5 mg	N/A

*: methadone dose conversion changes with increasing dose

I. Morphine ^{3,4}

1. Morphine is a naturally occurring opiate derived from opium. Its half-life ($t_{1/2}$), the amount of time it takes for one half of the medication to clear from the bloodstream, is 1-6 hours. Morphine's duration of analgesia is 3-6 hours. Morphine is metabolized to normorphine. Metabolites of medications are important in the evaluation of postmortem toxicology testing. These metabolites are often present even when the parent drug is no longer able to be detected.

J. Fentanyl ^{3,4}

1. Fentanyl is a synthetic opioid medication that was first synthesized in 1960. It is 100 times more potent than morphine. Fentanyl's $t_{1/2}$ is 200

minutes and its duration of analgesia is 0.5-2 hours. Fentanyl is metabolized to norfentanyl.

K. Hydrocodone ^{3,4}

1. Hydrocodone is a semi-synthetic opioid medication. Hydrocodone's $t_{1/2}$ is 4 hours and its duration of analgesia is 4-8 hours. Hydrocodone is metabolized to norhydrocodone, hydromorphone and hydrocodone.

L. Oxycodone ^{3,4}

1. Oxycodone is a semi-synthetic opioid medication that was first marketed in 1917. Oxycodone's $t_{1/2}$ is 2-5 hours and its duration of analgesia is 4-6 hours. Oxycodone's metabolites are noroxycodone and oxymorphone.

M. Methadone ^{3,4}

1. Methadone is a synthetic opioid medication that was synthesized in Germany in 1939. Methadone was recommended for the treatment of heroin addiction in 1965. Methadone's $t_{1/2}$ is 15 -72 hours and its duration of effect is 6-10 hours. Methadone is metabolized to 2-ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidine (EDDP) and 2-ethyl-5-methyl-3,3-diphenylpyrrolidine (EMDP).

N. Heroin ^{3,4}

1. Heroin is an opiate synthesized from morphine in 1874 and was originally marketed to treat cough. Today, heroin is classified as a drug of abuse without therapeutic properties. Heroin is twice as potent as

morphine. It has a $t_{1/2}$ of 3 minutes and its duration of analgesia is 3-4 hours. Heroin is metabolized to morphine and 6-monoacetyl-morphine (6-MAM).

O. Except for heroin, each of these opioid medications is approved by the U.S. Food and Drug Administration (FDA) as an analgesic for the treatment of pain.

1. Methadone is also approved for the detoxification treatment and maintenance treatment of opioid addiction.

P. These drugs are considered scheduled medications by the US Drug Enforcement Administration (DEA).⁵

1. Drugs, substances and certain chemicals used to make drugs can be scheduled (classified) into one of five categories (I-V) based upon the drug's acceptable medical use and potential for abuse and dependence.
2. The DEA defines Schedule I drugs as those with no acceptable medical use and a high potential for abuse and dependence.
 - a. Heroin is an example of a Schedule I drug.
3. The DEA defines Schedule II drugs as those with a high potential for abuse, with use potentially leading to severe psychological or physical dependence.
 - a. Morphine, hydrocodone, oxycodone, methadone and fentanyl are examples of Schedule II drugs.
4. Schedule V drugs are considered those with the lowest potential for abuse or dependence in the classification.

a. Lomotil is an example of a Schedule V drug.

Q. Morphine Milligram Equivalents (MME) and Morphine Equivalent Dose (MED)⁶

1. The morphine milligram equivalents and morphine equivalent dose are ways to compare all the relative potencies of various opioids using a standard metric.
2. Morphine is considered the standard for the treatment of moderate to severe pain and is commonly used as a reference point.
3. The amount of opioid prescription medication a patient uses is converted to a common unit of milligrams of morphine.
4. Conversion tables are used to convert the dose of the opioid medication in question into a morphine milligram equivalent.
5. Calculating Morphine Milligram Equivalents (MME)⁶

OPIOID (doses in mg/day except where noted)	CONVERSION FACTOR
Codeine	0.15
Fentanyl transdermal (in mcg/hr)	2.4
Hydrocodone	1
Hydromorphone	4
Methadone	
1-20 mg/day	4
21-40 mg/day	8
41-60 mg/day	10
≥ 61-80 mg/day	12
Morphine	1
Oxycodone	1.5
Oxymorphone	3

- a. Below as an example is how one would calculate the MME for oxycodone 10 mg tablets taken 4 times a day:
 - i. $10 \text{ mg} \times 4 = 40 \text{ mg.}$
 - ii. $40 \text{ mg} \times 1.5 \text{ (MME conversion factor for oxycodone)} = 60 \text{ MME.}$
6. Generally, as the MED increases, the likelihood of an adverse effect from the opioid medication increases also.⁷
7. Guidelines from the CDC for safer dosing of opioid medications:^{6,8}
 - a. Recommend exercising caution when prescribing opioids at any dose and prescribing the lowest effective dose.
 - b. Note that doses of 50 MME per day or higher are associated with nearly twice the risk of overdose compared to doses < 20 MME per day. (OR=1.9-4.6)
 - c. Recommend avoiding or carefully justifying increasing the dose to $\geq 90 \text{ MME/day.}$ (OR=2 – 8.6)

VI. Adverse Effects of Opioid Medications

- A. Like any other medication, opioid medications have benefits and risks associated with their use.
- B. In the United States, pain is the most common chief complaint that causes patients to seek medical care.⁹
 1. More than 30% of Americans have some form of acute or chronic pain.⁸

- C. Opioid medications have been FDA approved to treat pain resulting from various medical conditions.
- D. Opioids are commonly prescribed for pain.
 - 1. In their use as an analgesic, opioids are the most commonly prescribed class of medications in the United States.¹⁰
 - 2. It is estimated that 20% of patients presenting to their physician's office with non-cancer pain or other pain related diagnoses are prescribed an opioid.⁸
- E. As with other medications, opioid medications can have adverse effects. The adverse effects of these medications may include: CNS and respiratory depression, constipation, hyperalgesia, hearing loss, abuse, addiction and overdose.

VII. Abuse and Addiction

- A. Addiction, as it applies to medications, is a maladaptive pattern of substance use leading to clinically significant impairment or distress.¹¹
- B. Opioid use disorder (OUD) has replaced the term opioid dependence and is a problematic pattern of opioid use leading to clinically significant impairment or distress.¹²
 - 1. The diagnosis of OUD is applied when two or more of the following criteria occur in a 12-month period:

DSM-5 Criteria for Diagnosis of Opioid Use Disorder*

Opioids are often taken in larger amounts or over a longer period of time than intended.
There is a persistent desire or unsuccessful efforts to cut down or control opioid use.
A great deal of time is spent in activities necessary to obtain the opioid, use the opioid, or recover from its effects.
Craving, or a strong desire to use opioids.
Recurrent opioid use resulting in failure to fulfill major role obligations at work, school or home.
Continued opioid use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of opioids.
Important social, occupational or recreational activities are given up or reduced because of opioid use.
Recurrent opioid use in situations in which it is physically hazardous
Continued use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by opioids.
*Tolerance, as defined by either of the following: (a) a need for markedly increased amounts of opioids to achieve intoxication or desired effect (b) markedly diminished effect with continued use of the same amount of an opioid
*Withdrawal, as manifested by either of the following: (a) the characteristic opioid withdrawal syndrome (b) the same (or a closely related) substance are taken to relieve or avoid withdrawal symptoms

* These criteria do not apply to individuals taking opioids solely under appropriate medical supervision.

C. It is difficult to define the exact number of patients with addiction or OUD, as there is difficulty in diagnosing abuse, misuse, and OUD in this patient population and in differentiating these diagnoses from diagnoses for other mental illnesses, such as depression. Additionally, there are inconsistent subjective definitions of these conditions in the medical literature.¹³

1. Recent reviews of the medical literature to define prescription opioid

abuse and OUD found a wide prevalence range from < 1% to 40%.^{13,14}

- a. A 2015 review of 17 studies involving 88,235 patients showed a wide range of opioid dependence (0-24%) but a median incidence of only 0.5%. ¹⁴
2. A clinical study of opioid naïve post-surgical patients requiring opioid medications noted rates of persistent opioid use (greater than 3 months after surgery) of 5.9 – 6.5%. ¹⁵
3. A clinical study of 39,140 opioid naïve post-surgical patients requiring opioid medications noted a rate of persistent opioid use (greater than 3 months after surgery) of 3.1%. ¹⁶
4. A review of medical records from 1,294,247 patients prescribed opioid medications for acute pain noted 2.6% of patients were still taking opioid medications ≥ 1 year later. ¹⁷
5. A clinical study of > 675,000 patients having urological surgery requiring opioid pain medications found a rate of opioid dependence or overdose of 0.09%. ¹⁸

D. Patients who abuse opioid medications dramatically increase their rates of opioid addiction and overdose compared to patients not taking opioids.

1. A study of patients in a methadone clinic noted that while many users initially received opioid medications to treat pain, the majority of the abusers of these drugs obtain them illicitly or from friends. ¹⁹
2. Between 21% and 29% of patients prescribed opiates for chronic pain misuse them. ²⁰

3. Risk factors for addiction include patients with mental illness (especially depression), substance use disorder (including alcoholism, adolescents, the use of opiates greater than three months), and daily doses greater than 100 MME.¹⁰

VIII. Overdose

- A. As with most medications, when opioid medications are used appropriately for medical purposes they are generally safe and effective. However, excessive use, the use of high doses, prolonged duration of use and use with other CNS depressants can result in adverse events such as toxicity and overdose.
- B. The syndrome of opioid toxicity results in mental status depression, respiratory depression and hypoventilation, miosis and hypoperistalsis.³
 1. Respiratory depression and CNS depression are both concerning because if left untreated, they can lead to morbidity and death.
 2. Respiratory depression is the primary cause of death from opioid overdose.
- C. Multiple risk factors place certain patients at higher risk of these adverse effects including death:¹⁰
 1. Sleep apnea.
 2. Higher doses of opioid medications, especially when the MME exceeds 100 mg/day.⁷
 3. Long acting or extended release formulations of opioid medications.²¹

a. These formulations were thought to better ensure compliance with less frequent dosing and provide an improved steady state opioid concentration in the blood to provide improved pain relief.

4. The use of methadone to treat pain.²²

5. The concurrent use of opioid medications with sedatives such as benzodiazepines and alcohol.^{13,23}

a. Studies show a ten-fold increase in death when opioid medications are prescribed with benzodiazepines versus opioid medications alone.²⁴

b. CDC data from 2005 to 2009 noted the most common cause of polysubstance overdose deaths were opioid medications combined with benzodiazepines.²⁵

6. The use of opioids longer than three months.

7. Age greater than 65 years old.

8. Renal or hepatic impairment.

9. Depression.

a. Patients with chronic pain have rates of suicidal ideation and behavior ranging from 22% to greater than 50%.¹³

10. Substance use disorder, including alcoholism.

11. History of previous overdose.

12. Returning to opioid use after a period of sobriety (loss of tolerance).²⁶

D. A study of 295 people dying of unintentional pharmaceutical overdoses found:²⁷

1. The majority (67.1%) were men.
2. The majority (91.9%) were between the ages of 18 and 54.
3. Multiple contributory drugs were implicated in the majority (79.3%) of these deaths.
4. The majority of the medications (63.1%) were diverted and not prescribed to the decedent.
5. The majority (94.6%) of the decedents had known risk factors for substance abuse.

IX. Heroin and Fentanyl

- A. Several studies have estimated that the percentage of individuals who misuse prescription opioids and then initiate heroin is, variously, <4% or up to 6%.
10,28,29
- B. It is estimated that approximately 80% of people who use heroin previously misused prescription opioids.²⁸
 1. However, in 2010, this number began to change.
 2. Of individuals entering treatment for a substance abuse disorder who abused opioids, 8.7% used heroin as their first opioid in 2005. But in 2015, that number had increased to 33.3%.^{29,30}
 3. It is estimated that 23% of individuals who use heroin will develop opioid addiction.³¹

4. My personal experience with adolescent heroin users in our detox program was that in 2011, heroin started to become the first opioid to which my patients were exposed. The majority of them started using heroin due to its low price and easy access.

a. This has also been reported in other cities for similar reasons. ^{29,32}

C. In studies of persons using heroin, 23% have overdosed on it and 48% of users knew someone who did. ³³

D. Risk factors for fatal overdose with heroin include concomitant use of other drugs, alcohol abuse, recent abstinence, and fluctuations in the concentration and purity of heroin and adulterants. ^{26,34}

1. In many cities, the majority of the heroin supply is contaminated with adulterants. ³⁵

2. Most fatal heroin overdoses do not have a serum concentration of morphine, the metabolite of heroin, different from those of living users.

This raises the concern that it is not the heroin that caused the fatal overdose but a contaminant such as fentanyl or one of its analogues. ³⁶

3. Fentanyl and its analogues are 50 to >100 times more potent than heroin itself. This large increase in potency has led to the large increase in opioid-related deaths since 2013. ^{37,38}

4. According to the DEA, this fentanyl is generally not being diverted from pharmaceuticals, but instead is being manufactured in other countries such as China and Mexico and smuggled into the US for sale. ^{37,39,81}

X. The Challenge of “Cause of Death” Determination and Opioids

- A. Any drug or medication taken in sufficient quantity can cause death. The risk of death is the primary concern in treating opioid overdoses.
- B. Multiple reports from state and federal agencies have reported various numbers of opioid medication overdoses and deaths.³⁹⁻⁴³
- C. Determining the cause of any potential overdose death should be a thorough process that includes reviewing the deceased’s previous medical history, their prescription medication history, investigation of the scene of the death, a complete anatomical examination and autopsy with forensic toxicology testing.^{44,45}
 - 1. However, in many cases, coroners and medical examiners do not have all the information they need to determine the cause of death. Therefore, they often must make decisions regarding cause of death with limited information and sometimes only forensic toxicology testing.
 - 2. Reviewing a decedent’s prior medical and medication history is important and should be done to better understand the circumstances of their death and factors that may be associated with their death.⁴⁶
- D. Forensic Toxicology Testing

1. During an autopsy, samples of the decedent's blood, urine, and vitreous humor are often obtained for forensic analysis. These body fluids are often referred to as matrices for forensic analysis.
 - a. Blood is most commonly used to determine a concentration or level of a drug or chemical.
 - b. Urine can be used to determine the presence of a drug or its metabolites. However, many drugs accumulate in the urine and may be found in the urine long after the use of a drug or medication and after the disappearance of the drug or urine from the blood. Therefore, urine can be used to determine an exposure to a drug but not to determine intoxication, impairment or cause of death.^{47,48}
 - c. Vitreous humor, obtained from the eye, is another source to determine the presence of a drug or chemical.
2. These samples are analyzed to determine the presence or lack of medications and drugs.
 - a. Often drugs and medications are present and must be evaluated to determine whether they caused or contributed to the decedent's death.
 - b. In cases of opioid overdoses, benzodiazepines and cocaine are often found on postmortem testing and their presence must be

carefully interpreted to determine their role in the decedent's death.

- i. Studies have noted the presence of benzodiazepines in the postmortem toxicology testing of 30 – 60.4% of fatal opioid overdoses.^{49,50}
- ii. According to the CDC, in 2017, there were 13,942 cocaine-related deaths of which 10,131 (73%) also involved an opioid.⁵¹
- iii. According to the CDC, in 2017, there were 11,537 benzodiazepine-related deaths of which 10,010 (87%) also involved an opioid.⁵¹
- iv. In a review of 19,413 synthetic opioid (fentanyl and analogues) deaths, 79.7% of these involved another drug or alcohol.⁵²

3. If a sample is positive for a medication or drug, further analysis is done to confirm its presence and to obtain a level or concentration of the medication or drug.
4. These levels must then be interpreted by the forensic or medical toxicologist to determine if the drug or medication caused or contributed to the decedent's death.⁵³
5. The interpretation of these levels is often a difficult process.

Postmortem samples are very different than antemortem samples and

therefore yield very different results. Therefore, caution must be applied to the interpretation of any drug or chemical concentration in a postmortem matrix.

- a. It was previously thought that there was not much difference between levels obtained antemortem versus postmortem, but studies over the last few decades have proven this concept incorrect.⁴⁷
- b. Multiple sources are published regarding concentrations of drugs and medications in the antemortem and postmortem setting.⁵⁴⁻⁵⁷
- c. A therapeutic drug concentration is a level of a drug that produces a desired effect.
- d. A toxic drug concentration is a level of a drug that produces a toxic, impairing or undesirable effect.
 - i. These levels are often obtained from persons investigated for impairment or operating a motor vehicle under the influence of a drug.
- e. A fatal or lethal drug concentration is a postmortem level of a drug that was found in persons who have died and was determined to be the cause of their death or to have contributed to their death.
- f. The interpretation of postmortem drug levels is dependent on multiple variables including:^{47,58,59}

- i. Whether the blood obtained was a central (heart/cardiac) sample or a peripheral (femoral vein or artery) sample.
- ii. The time interval from death to the sample collection.
- iii. The time interval between the last dose of the drug or medication and death.
- iv. Any movement of the body after death including resuscitation efforts.
- v. Any traumatic injury causing disruption of major organs or blood vessels.
- vi. The sample collection technique and assurance of proper sample preservation.

g. A phenomenon known as postmortem redistribution (PMR) occurs with many drugs after death. PMR can cause drug concentrations to increase after death and to be higher than the actual concentration of the drug or medication when the person was alive or immediately preceding their death.^{47,59,60}

- i. Each of the factors listed above are associated with PMR and can cause drug concentrations to be elevated greater than the actual antemortem concentration prior to the decedent's death.

h. Given all of these factors, a decedent's cause of death cannot be accurately determined from an isolated postmortem drug concentration alone.⁴⁴

i. A study comparing medical toxicologists' and medical examiners' interpretation of postmortem drug concentrations and the contribution of the drugs to the cause of death showed agreement in only 66% of cases.⁵³

6. Postmortem concentrations of opiates and opioid medications must be interpreted carefully as they are subject to the same difficulties mentioned above.⁴⁵

a. Studies have shown that these medications are subject to PMR and therefore postmortem concentrations of these medications may actually be higher than the concentration all of these medications prior to the decedent's death.^{57,61-63}

b. Without knowing a thorough history of the decedent, it is difficult to know if the person experienced tolerance to the opioid medication or if they previously had tolerance and recently lost it due to abstinence for various reasons such as incarceration or drug treatment.

c. Multiple studies have noted that concentrations of opioid medications can overlap the therapeutic, toxic and lethal ranges that are reported for these drugs.

- i. A postmortem study in which hydrocodone was detected in all blood samples noted deaths attributed to hydrocodone had an over-lapping concentration range (0.07 – 2.1 mg/L) with cases where the deaths were not attributed to hydrocodone (0.02-1.4 mg/L).⁶⁴
- ii. A study by the Cuyahoga County Coroner's Office noted similar findings with hydrocodone, methadone and oxycodone. They stated: "There was an overlap in the range of blood concentrations observed for the drug-related death groups and the incidental findings groups."⁶⁵

d. Therefore, determining the cause of death based solely on a postmortem drug concentration is problematic and should be avoided.

e. A complete anatomical autopsy is an important part of a determining the decedent's cause of death.⁴⁵

- i. Deaths from opioid overdoses often have characteristic autopsy findings such as pulmonary edema, cerebral edema and bladder distention.⁶⁶
- ii. Track marks may be seen in someone injecting opioids or opiates.
- iii. Powdered drug residue may be seen in the nares of persons snorting opioids or opiates.

E. Many jurisdictions, including Cuyahoga and Summit County, report their number of opioid fatalities. However, in order to determine the reliability of these statistics, the following questions must be answered:

1. How many of these deaths were determined by postmortem drug concentrations alone?
2. How many of these deaths involved solely opioids and not a combination of other drugs like cocaine or benzodiazepines?
3. How many of these deaths had complete autopsies demonstrating the known findings consistent with fatal opioid overdoses?
4. How many of these deaths had complete medical histories and medication histories reviewed to determine the presence of tolerance or underlying medical morbidities such as heart or lung disease that may have contributed to the decedent's death?
5. In light of the absence of this information and the inability to conduct some of these analyses retrospectively, the number of deaths caused by opioids cannot be accurately determined.

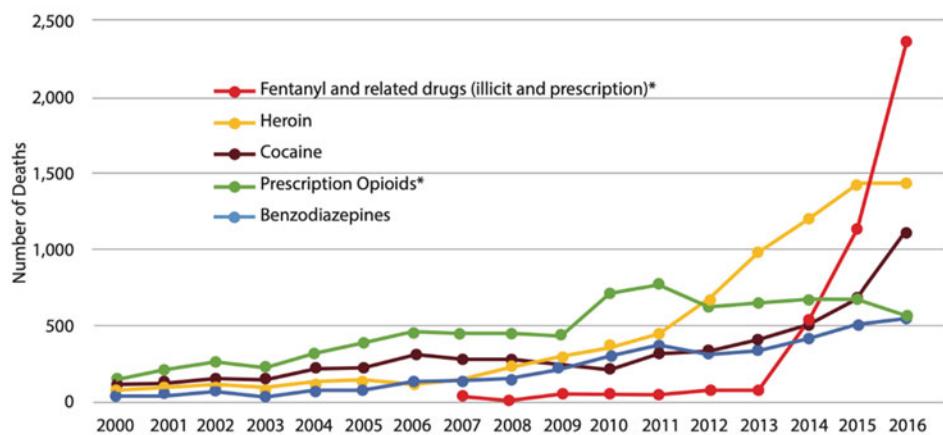
XI. Ohio and Opioid Overdoses

- A. As discussed above, it is difficult and often impossible to accurately determine the number of deaths caused by opioids. However, the available data, while limited, do show certain trends over time.

B. In 2007, unintentional drug overdose deaths replaced motor vehicle accidents as the leading cause of injury-related or non-intentional deaths in the state of Ohio.⁶⁷

C. Deaths from prescription opioid medications started to increase in 2000, peaked in 2011, and have declined for the last 6 years.⁶⁸

Numbers of Unintentional Drug Overdose Deaths in Ohio 2000-2016



D. In 2009, deaths from benzodiazepine started to increase and in 2017 have since equaled the percentage of deaths from prescription opioids.⁶⁸

E. In 2010, cocaine deaths started to increase and surpassed deaths from prescription opioids in 2015. Cocaine is now the third leading cause of drug overdose deaths in Ohio.⁶⁸

1. In 2017, there were 1,540 cocaine-related deaths in Ohio, an increase of 39% from the previous year.

F. In 2007, fentanyl and its analogues started appearing in postmortem lab samples of deceased heroin addicts.⁶⁸

1. In 2017, 71% of all unintentional drug related deaths in Ohio were due to fentanyl and its analogues.
- G. In 2015, there were more deaths due to fentanyl and its analogues than from prescription opioids.⁶⁸
- H. By 2016, more deaths were due to fentanyl and its analogues than heroin, which peaked in 2014.⁶⁸
- I. In 2011, Governor John Kasich established the Governor's Cabinet Opiate Action Team (GCOAT), which issued opioid prescribing guidelines to emergency departments and acute care facilities in 2012. Similar guidelines were issued for the management of chronic pain in 2013 and outpatient management of acute pain guidelines in 2016. (Addenda C-E)
 1. These guidelines were designed to (1) promote responsible use of opioids; (2) reduce the supply of opioids; (3) focus on drug abuse prevention; and (4) expand access to treatment.
 2. In 2012, the number of opioid doses dispensed to Ohio patients peaked and in subsequent years, a steady decline of prescription opioids has followed with an overall decline of 41% by the end of 2018.^{68,69}
 - a. During this same period, deaths secondary to opioid medications declined by 28%.

XII. Addiction Not Involving Prescription Opioid Medications

A. Even with the decline in prescription opioid overdoses and deaths, other drugs have surpassed prescription opioids as the leading causes of overdoses and deaths.^{42,70-73}

1. Nationally, by the end of 2016 the rate of drug overdose deaths continued to increase.⁷⁴
2. In 2015, heroin and fentanyl deaths had surpassed the number of opioid medication deaths.^{73,75,76}
 - a. This was also the first year that prescription opioid medications were not listed in the top three drugs causing death.
3. Since 2011, cocaine has ranked every year as the second or third most common drug found in drug overdose deaths.^{42,71,72}
 - a. Between 2014 and 2016 cocaine overdose deaths have doubled.
4. In 2016, methamphetamine (#4) and benzodiazepines (#5) ranked higher in the list of drugs causing overdose deaths than prescription opioid medications.⁷²

B. Fentanyl, heroin, cocaine and benzodiazepines, are now the most common drugs in fatal overdoses.⁷⁰

1. Efforts to better control and treat addiction should be the focus, rather than limiting access to a specific class of drugs or medications.
2. When heroin and fentanyl became cheaper and easier to obtain, abuse of these drugs increased.⁷⁰ Deaths from these drugs rapidly increased and surpassed the numbers from prescription opioids.

3. Now there is an increase in cocaine and benzodiazepine addiction and fatal overdoses despite the decline in opioid medication overdoses.
4. Two recent studies noted that limiting prescription opioids would only increase deaths in the short term (5-10 years) and only decrease deaths by 5% by the year 2025, as people continue to initiate the use of more risky opioids such as heroin, fentanyl and its analogues.^{74,77}
 - a. Both studies call for a multi-pronged approach to this complex problem and not just the limiting of opioid prescriptions.
5. The authors of the CDC's guidelines on prescribing opioids have just warned that overzealous misapplication of the guidelines may result in patient harm.⁷⁸
 - a. They note outpatient opioid prescribing has declined since 2012.
 - b. They note many physicians and agencies have been inconsistent in applying the guidelines and have gone beyond them to the potential detriment of patients, including practices such as:
 - i. The use of hard limits to opioid medication dosages.
 - ii. Abrupt discontinuation of opioid medications.
 - iii. The dismissal of patients from medical practices.
 - iv. Improper application of the guidelines to patients with cancer, surgical patients, those with sickle cell crises and those being treated for opioid use disorder.

- c. The authors caution against misapplication of the ≥ 90 MME/day guidelines in patients on chronic opioids.
 - i. They note that when the guidelines are improperly applied or patients are abruptly cut-off from opioids, patients may "seek other sources of opioids or have adverse psychological or physical outcomes."
 - ii. The authors remind clinicians that patient treatment must be individualized and not generalized under these guidelines.
- d. They also note "We need better evidence in order to evaluate the benefits and harm of clinical decisions regarding opioid prescribing....".

C. I have reviewed the opinion of Plaintiffs' expert Dr. Katherine Keyes with respect to her conclusions regarding naloxone distribution. I use naloxone in my practice as appropriate to treat opioid overdoses and interact with emergency responders who also use naloxone.

- 1. As Dr. Keyes notes, there is an absence of reliable evidence about the effect of widespread administration of naloxone to addicts, including whether it results in reduced overdose deaths.
- 2. While naloxone can prevent individuals from dying from a particular overdose, it is unknown how its administration affects subsequent addict behavior. For example, the administration of naloxone induces

abrupt withdrawal in an addict. When I administer it in the emergency department, my patients often express a desire to leave the hospital as soon as possible in order to obtain additional opioids to mitigate the effects of opioid withdrawal. When naloxone is administered outside the medical setting, the likely course of action by the addict is to take more narcotics.

3. While Dr. Keyes recommends that every individual with an opioid use disorder be given a naloxone administration kit, she has not examined whether every such individual would accept naloxone. At my institution, we make naloxone administration kits available free of charge to patients with opioid use disorder. Only approximately 50% of our patients, however, even express interest in the kits when offered, and only about a quarter actually leave the emergency department with one. The “needs” for naloxone distribution estimated by Dr. Keyes do not account for individual willingness to use or carry naloxone.

D. I have also reviewed the opinion of Plaintiffs’ expert Dr. Katherine Keyes with respect to her conclusions regarding the need for distribution of fentanyl test strips to be used “during routine clinical toxicology testing, including at hospitals, emergency departments, clinics and treatment centers” and by individual users of opioids.

1. Dr. Keyes's recommendation for the use of fentanyl test strips as part of treatment at hospitals and emergency department does not take into account several factors.
 - a. First, contamination of the heroin available in Ohio with fentanyl is so widespread that there is limited need for testing to guide a patient's treatment or his subsequent behavior. Informal analyses of data from the Ohio Bureau of Criminal Investigation indicate that in 2017 nearly 50% of confiscated heroin contained a synthetic opioid (e.g. fentanyl, carfentanil) and in 2018 that number rose to nearly 70%.^{79, 80} In short, users of heroin in Ohio and the doctors who treat them expect that they are being regularly exposed to fentanyl. In my practice as an emergency medicine physician, I counsel my patients with OUD accordingly. The presence of fentanyl testing would not change this behavior.
 - b. Second, it is exceptionally rare that a patient's drug supply is available for testing at a medical facility. Patients with OUD or SUD are unlikely to give their drugs to an authority that will confiscate them. In addition, other individuals present at the time of the patient's injury may either steal or dispose of the relevant substance long before the patient reaches the hospital.
 - c. Third, there are significant legal restrictions on the permissibility of "bedside tests" like fentanyl test strips in hospitals under the

federal Clinical Laboratory Improvement Amendments. Dr. Keyes has not considered whether the use of fentanyl test strips would be legally permissible in the hospitals and clinics in which she advocates their use.

XIII. Conclusion and Expert Medical Opinion

- A. Based on my review of the materials referenced, my experience and training as a Board-Certified Medical Toxicologist and Emergency Medicine physician, as well as my interpretation of the relevant medical literature, I have reached the following conclusions and opinions on this date based on a reasonable degree of medical and scientific certainty. I reserve the right to amend my report should any new information be provided to me regarding this matter.
- B. Opioids, like any medication, have proper indications and dosing guidelines for safe use.^{8,78}
- C. Opioids have established risk factors for addiction and overdose. Minimizing the prescribing of opioids to patients with these risk factors is an important part of the effort to prevent overdose and death.^{7,10,13,21-23,26,27}
- D. It is difficult to determine an accurate number of opioid deaths due to the problems with cause of death reporting secondary to the lack of needed factors to prove causation in these deaths and interpretation of postmortem drug concentrations.^{45,53}

E. The problem of addiction continues despite declining opioid prescriptions and use. Over the last few years, people are dying from heroin, fentanyl and non-opioid drugs like cocaine and methamphetamine in record numbers.^{71,72} Without a focus on the problem of addiction itself and these non-opioid drugs, the rates of overdose and death will continue to increase.

F. As recent studies have shown, addiction is a complex problem with no single, simple solution. Focusing only on decreasing the number of opioid prescriptions will only address a small portion of the problem.^{74,77,78}

Sincerely,



Heath A. Jolliff, DO, FACEP, FAAEM, FACMT

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Addendum A:
Fee Schedule for Heath A. Jolliff, DO
Mid-Ohio Toxicology Services, LLC

Fee Schedule

I am compensated for my time with a flat fee of \$500 per hour.

Any travel expenses are reimbursed at cost.

**Addendum B:
CV for Heath Jolliff, DO**

Heath A. Jolliff, D.O., FACMT, FACEP, FAAEM

Mid-Ohio Toxicology Services, LLC.

175 South Third St.; Suite 200

Columbus, OH 43215

Office: (614) 859-6687

HJolliff@MidOhioTox.com

Current Appointments

Medical Toxicology

OhioHealth-Doctors Hospital
Director, Medical Toxicology
Columbus, OH
10/2002 – present

Mid-Ohio Toxicology Services, LLC.
President; Medical Toxicologist
Columbus, OH
9/2001 – present

Emergency Medicine

Adena Regional Medical Center
Emergency Medicine Residency
Associate Program Director
Chillicothe, OH
10/2015 – present

Schumacher Group
Adena Regional Medical Center
Department of Emergency Medicine
Chillicothe, OH
11/2012-present

Ohio University College of Osteopathic Medicine
OhioHealth-Doctors Hospital
Clinical Professor of Emergency Medicine
Columbus, OH
10/2002 – present

Medical Editing

American Osteopathic Board of Emergency Medicine
Medical Toxicology Board Examination
Subject Matter Expert
Chicago, IL
2018 – present

Clinical Toxicology
Manuscript Reviewer
New York, NY
2016 - present

Western Journal of Emergency Medicine
Manuscript Reviewer
Orange, CA
2015 - present

Journal of Medical Toxicology
Manuscript Reviewer
Philadelphia, PA
2011 – present

Lexi-Comp, Inc.
Toxicology Database (*Lexi-Tox*)/Monograph Editor
Huron, OH
2008 – present

Licensure

- * State of Ohio; Ohio State Medical Board, 1993 – 2020
- * State of Colorado; Colorado State Medical Board, 2001-2021

Board Certification

- * Board Certified, Diplomat, American College of Osteopathic Emergency Physicians; 2000-2020
- * Board Certified, American Osteopathic Board of Emergency Medicine, Subsection of Medical Toxicology; 2007-2027
- * Successful completion of National Board of Osteopathic Medical Examiners parts I-III

Previous Employment/Appointments

Premier Health Care Services Inc.
Berger Hospital
Department of Emergency Medicine
Circleville, OH
9/2009-4/2017

The Journal of Pediatrics
Manuscript Reviewer
Cincinnati, OH
2013

Kansas City University of Medicine and Bio-Sciences
Department of Internal Medicine
Clinical Associate Professor; Medical Toxicology/ Emergency Medicine
Kansas City, KS
10/2010 – 10/2015

Premier Health Care Services Inc.
Marion General Hospital-OhioHealth
Department of Emergency Medicine
Marion, OH
9/2012-12/2013

Medical Toxicology Fellowship Program Director
Clinical Assistant Professor
Department of Emergency Medicine
The Ohio State University
Columbus, OH
1/2009 – 5/2013

Clinical Assistant Professor
Department of Pediatrics
The Ohio State University
Columbus, OH
11/2009 – 5/2013

Central Ohio Poison Center
Pediatric Academic Association
Nationwide Children's Hospital
Associate Medical Director
Columbus, OH
2/2008 – 5/2013

The Ohio State University Medical Center
Department of Emergency Medicine
Clinical Assistant Professor
Columbus, OH
11/2011 – 5/2013

Premier Health Care Services Inc.
Adena Regional Medical Center
Department of Emergency Medicine
Chillicothe, OH
9/2009-9/2011

Emergency Medicine Physicians, Limited
OhioHealth-Doctors Hospital
Department of Emergency Medicine
Columbus, OH
8/2007 – 9/2009

University of Colorado at Denver and Health Sciences Center
Assistant Clinical Professor
Department of Surgery
Division of Emergency Medicine
Denver, CO
12/2006 – 10/2007

Rocky Mountain Poison and Drug Center
Denver Health Medical Center
Volunteer Faculty
Denver, CO
12/2006 – 8/2007

Emergency Physicians of Porter Hospital
Centura Porter Adventist Hospital
Department of Emergency Medicine
Denver, CO
12/2006 – 8/2007

Emergency Physicians of Porter Hospital
Centura Littleton Adventist Hospital
Department of Emergency Medicine
Littleton, CO
12/2006 – 8/2007

Emergency Physicians of Porter Hospital
Centura Parker Adventist Hospital
Department of Emergency Medicine
Parker, CO
12/2006 – 8/2007

Emergency Medicine Physicians, Limited
OhioHealth-Doctors Hospital
Department of Emergency Medicine
Columbus, OH
10/2002 – 12/2006

OhioHealth-Grant Medical Center
Chair; Section of Medical Toxicology
Columbus, OH
9/2001 – 11/2002

Mid-Ohio Emergency Physicians
OhioHealth-Grant Medical Center/Riverside Methodist Hospitals
Department of Emergency Medicine
Staff Physician
Columbus, OH
7/2001 – 10/2002

University of Colorado Health Science Center
Department of Emergency Medicine
Clinical Instructor
Denver, CO
2001

Mid-Ohio Emergency Physicians
OhioHealth-Grant Medical Center/Riverside Methodist Hospitals
Department of Emergency Medicine
Columbus, OH
5/1998 - 7/1999

Grandview Emergency Corporation
Department of Emergency Medicine
Courtesy Staff
Dayton, OH
1997

Previous Appointments

Ohio Chapter of the American College of Emergency Medicine
Pharmacology/Toxicology Case Studies
Columbus, OH
2012

American College of Medical Toxicology
Ethics Committee Task Force
Fairfax, VA
2004-2007

Internet Journal of Medical Toxicology
Expert Peer Reviewer
Fairfax, VA
2005

Marcel Dekker, Inc.
Expert Peer Reviewer; Journal of Toxicology-Clinical Toxicology
New York, NY
5/2003 – 2005

OhioHealth-Doctors Hospital/Albert Einstein Medical Center
Course Co-Director
Toxicology Boot Camp Course
Columbus, OH
2004

American College of Osteopathic Emergency Physicians
Committee on Continuing Medical Education
Chicago, IL
2004

CRUSADE Research Program
OhioHealth-Grant Medical Center
Emergency Department Co-Advocate
Columbus, OH
1998-1999

Micromedex, Inc.
Assistant Editor; *Poisindex*
Denver, CO
7/1999 – 7/2001

American College of Osteopathic Emergency Physicians
Course Co-Director
New Frontiers in Toxicology Course
Chicago, IL
2000-2003

American College of Osteopathic Emergency Physicians
Co-Chair; Section of Medical Toxicology
Chicago, IL
2000-2010

University of Colorado Health Sciences Center
Instructor; School of Pharmacy
Denver, CO
5/2000 - 7/2001

Colorado Mountain College
School of Emergency Medical Services
Adjunct Professor
Breckenridge, CO
8/2000 - 7/2001

Education

Fellowship: Medical Toxicology; 1999-2001
Rocky Mountain Poison and Drug Center
University of Colorado Health Sciences Center
Denver, CO

Residency: Emergency Medicine; 1994 - 1997
Ohio University College of Osteopathic Medicine
Grandview Hospital Campus
Dayton, OH

Internship: Traditional Rotating; 1993 - 1994
Department of Internal Medicine
Grandview Hospital and Medical Center

Dayton, OH

Medical School: Doctor of Osteopathy; 1993
Ohio University College of Osteopathic Medicine
Athens, OH

Undergraduate: Bachelor of Arts; 1988
Wright State University
Dayton, OH

Awards/Honors

- * EM:RAP Challenge Coin Award for Excellence in Humanity & Emergency Medicine; 2019
- * Educator of the Year; Adena Health System Emergency Medicine Residency; 2015-2016
- * Fellow, American College of Medical Toxicology; 2012
- * Outstanding Preceptor Award; OhioHealth-Doctors Hospital/OUCOM Emergency Medicine Residency; 2010-2011
- * Fellow, American Academy of Emergency Medicine; 2007
- * Outstanding Service Award; OhioHealth-Doctors Hospital/OUCOM Department of Emergency Medicine; 2006-2007
- * Outstanding Emergency Medicine Faculty Award; OhioHealth-Doctors Hospital/OUCOM Department of Emergency Medicine; 2004
- * Fellow, American College of Emergency Medicine; 2004
- * Outstanding Oral Presentation; Rocky Mountain Trauma and Emergency Medicine Conference Research Forum; 2000
- * Chief Resident; Emergency Medicine Residency Program, Grandview Hospital; 1997
- * M.D. Carter Award; Outstanding Internal Medicine Intern, Grandview Hospital; 1993
- * Outstanding Young Men in America; 1990

Membership

- * American Academy of Clinical Toxicology, 2000 – present
- * American Academy of Emergency Medicine, 2005-present
- * American College of Emergency Physicians, 1994 – present
- * American College of Emergency Physicians Subsection of Medical Toxicology, 2000 – present
- * American College of Medical Toxicology, 2000-present
- * American College of Osteopathic Emergency Physicians, 1998 – present
- * American Osteopathic Association, 1990 – present
- * Society of Academic Emergency Medicine, 2010-2012

Certification

- * Domestic Preparedness Course: Nuclear, Biological, Chemical Weapons; Instructor
- * Advanced Cardiac Life Support
- * Toxic Chemical Training for Medical Support Personnel

Areas of Interest

- * Medical Toxicology:
 - Toxicity resulting from repeated supra-therapeutic acetaminophen ingestion
 - Toxic alcohols
 - Medication safety/Adverse drug events and prevention/Patient safety
 - Forensic toxicology
 - Medical marijuana efficacy, safety and risk assessment
 - Risk assessment and communication
- * Emergency Medicine
 - Implementation of cost effectiveness to laboratory and ancillary studies
 - Implementation of cost effectiveness to medication orders
 - Stabilization and resuscitation of the critically ill patient
 - Design and implementation of treatment pathways
 - Application of evidence-based medicine
 - Coaching physician resilience in high stress environments

Research/Publications/Presentations

- * **Jolliff HA** and Kuffner EK. Metoclopramide. In: *The 5 Minute Toxicology Consult*; R.C. Dart, ed. Philadelphia: Lippincott, Williams & Wilkens, 1999.
- * **Jolliff HA** et al. Can the Diagnosis of Ethylene Glycol Toxicity Be Made Without Serum Ethylene Glycol and Osmolality Values? A Systematic Review; *J Toxicol Clin Toxicol* 2000; 38:539.
- * Waksman JC, Heard K, **Jolliff HA** et al. Serotonin Syndrome Associated with The Use of St. John's Wort (*Hypericum perforatum*) and Paroxetine. *J Toxicol Clin Toxicol* 2000; 38:521.
- * Daly FFS, Dart RC, Bogdan GM, **Jolliff HA**, Waksman JC. Repeated Supratherapeutic Dosing of Acetaminophen: Can Serum Transaminase Levels Predict Risk of Hepatotoxicity? *J Toxicol Clin Toxicol* 2000; 38:580.
- * **Jolliff HA** and Waksman JC. Lysergic Acid Diethylamide (LSD) as "Sweet Tarts" in Denver, Colorado. *Microgram* 2000; 33(9):2.
- * **Jolliff HA**, Fehrenbacher N, Dart RC. Bradycardia, Hypotension, and Tinnitus After Accidental Oxcarbazepine Overdose. (Abstract). *J Toxicol Clin Toxicol* 2001; 39:316-7.
- * **Jolliff HA**, et al. The Value of Serum Bicarbonate and Base Deficit in the Diagnosis of Ethylene Glycol Toxicity. A Systematic Review. (Abstract). *J Toxicol Clin Toxicol* 2001;

39:245.

- * Waksman J, Taylor RN, Bodor GS, Daly FFS, **Jolliff HA**, Dart RC. Acute Myocardial Infarction Associated with Amphetamine Use. *Mayo Clin Proc* 2001; 76:323-326.
- * **Jolliff HA**, Assistant Editor; Poisindex; Micromedex; Denver, Colorado; 1999 - 2001
- * Erdman AE, Mallea MC, **Jolliff HA**, Waksman JC, Dart RC. Is the Osmolar Gap (OG) a Reliable Surrogate for Ethylene Glycol (EG) Measurement? *J Toxicol Clin Toxicol* 2001; 39:480.
- * Bogdan GM, Hill RE, **Jolliff HA**, Daly FFS, Dart RC. Neutralization of United States *Latrodectus Mactans* and *L. Hesperus* Venoms with a Mexican *L. Mactans* Antivenom. *J Toxicol Clin Toxicol* 2001; 39: 496.
- * Erdman AE, **Jolliff HA**, Waksman JC, Earnst M, Dart RC. Empiric Treatment with Intravenous Acyclovir: Is it Safe? *J Toxicol Clin Toxicol* 2001; 39: 506.
- * **Jolliff HA**. Ethylene Glycol. In: Medical Toxicology 3rd Edition; RC Dart, ed. Philadelphia: Lippincott, Williams & Wilkens. 2004.
- * McKeon S, **Jolliff HA**. Efficacy and Cost Effectiveness of the Urine Drug Screen in the Emergency Department. 6/2004. (Completed but not published)
- * **Jolliff HA**. Book and Media Reviews: Poisoning & Drug Overdose, 4th ed. *Ann Emerg Med*. 2004; 44:292-293.
- * Daly FFS, O'Malley GF, Heard K, Bogdan GM, Dart RD. Prospective Evaluation of Repeated Supratherapeutic Acetaminophen (Paracetamol) Ingestion. (Data collection only). *Ann Emerg Med*. 2004; 44:393-8.
- * **Jolliff HA**. Isopropyl Alcohol. In: Critical Care Toxicology: Diagnosis and Management of the Critically Ill Patient; J Brent, ed. St. Louis: Elsevier-Mosby. 2004.
- * **Jolliff HA**. Book and Media Reviews: The Venomous Reptiles of the Western Hemisphere. *Ann Emerg Med*. 2005; 45(4):466.
- * **Jolliff HA**. Book and Media Reviews: Biological Weapons Defense: Infectious Disease and Counterterrorism. *Ann Emerg Med*. 2005; 46(1):101.
- * Bogdan GM, **Jolliff HA**, Daly FFS, Dart RC. Efficacy of a Mexican *Latrodectus* Antivenom in Neutralizing the Venom of *L. Hesperus* Collected in the United States and *L. hasseltii* Collected in Australia. *J Toxicol Clin Toxicol* (Submitted for publication) 2/2006.
- * Wilcox-White K, **Jolliff HA**, Sample J, Arendse A. Accuracy of Unenhanced CT for the Diagnosis of Acute Appendicitis: A Systematic Review. Ohio University College of Osteopathic Medicine, Emergency Medicine R-PAC Research Day. OhioHealth-Doctors Hospital (Poster Presentation) 5/2006
- * **Jolliff HA**. Books and Media Reviews: The Top 100 Drug Interactions: A Guide to Patient Management. *Ann Emerg Med* 2006; 48 (5):641
- * **Jolliff HA**. Books and Media Reviews: The Poison Quiz Book. *Ann Emerg Med* 2006; 48 (6): 764-65.
- * **Jolliff HA**. Books and Media Reviews: Medical Toxicology Review, 2nd Edition. *Ann Emerg Med* 2006; 48 (6):764
- * **Jolliff HA**. Books and Media Reviews: Manual of Overdoses and Poisonings. *Ann Emerg Med* 2006; 48 (5): 641-42.
- * Fenzl M, **Jolliff H**, Topinka M. Survey of Chemical Exposure Preparedness for Emergency Departments in a Midwestern City. *J Toxicol Clin Toxicol* 2007; 45 (6): 628 (abstract)

- * Conley-Dutkiewicz, L and **Jolliff HA**. Pneumonia and Antibiotic Treatment in the Emergency Department: The 4-Hour Window. Ohio University College of Osteopathic Medicine, Emergency Medicine R-PAC Research Day. OhioHealth-Doctors Hospital (Poster Presentation) 6/2008.
- * Fenzl M, **Jolliff H**, Topinka M. Chemical Exposure Preparedness for Emergency Departments in a Midwestern city. *Am J Disaster Med.* 2008; 3(5):273-281.
- * **Jolliff HA**, Casavant MJ, Teetsel RN, Rogers PD. A Novel Approach to the Treatment of Opioid Addiction in Adolescents. Poster presentation at the North American Congress of Clinical Toxicology. October 2009. San Antonio, Texas
- * **Jolliff HA**, Casavant MJ, Teetsel RN, Rogers PD. A Novel Approach to the Treatment of Opioid Addiction in Adolescents. *J Toxicol Clin Toxicol* 2009; 47 (7): 751.
- * Pruchnicki S, Baker SD, **Jolliff HA**. The Use of Modern Photographic Technology for Animal Identification. *Clinical Toxicology* (2009) 47(7): 709.
- * **Jolliff HA**, De Lucia AC, Thomas TN. Lipid Emulsion for the Treatment of Diphenhydramine Toxicity. Poster presentation at the North American Congress of Clinical Toxicology. Denver, CO 10/2010.
- * **Jolliff HA**, De Lucia AC, Thomas TN. Lipid Emulsion for the Treatment of Diphenhydramine Toxicity. *Clinical Toxicology* (2010) 48(6): 613.
- * **Jolliff, HA**, Malis E. Educate to Eradicate! Poison Prevention 101. Nationwide Children's Hospital *Teachable Moments* 2010; Summer: 5.
- * **Jolliff, HA**, Gochnour J. Complete Neurologic Recovery After Cardiac Arrest in a Cocaine Stuffer. Poster presentation at the North American Congress of Clinical Toxicology. September 2011. Washington, DC
- * Gochnour J, **Jolliff, HA**. Complete Neurologic Recovery After Cardiac Arrest in a Cocaine Stuffer. *Clinical Toxicology* (2011) 49(6):525.
- * Fletcher EN, Roberts K, **Jolliff HA**, McKenzie LB. Hydrocarbon-Related Poisonings in US Children \leq 5 years Presenting to an ED Compared to Calls to Regional Poison Centers, 2000 – 2009. The Research Institute at Nationwide Children's Hospital. Annual Poster Day Competition. Columbus, OH. 4/2012
- * Hays H, **Jolliff H**, Casavant M. The psychopharmacology of agitation: consensus statement of the American Association for Emergency Psychiatry project BETA psychopharmacology workgroup. *West J Emerg Med.* 2012; 13:1-2. (Letter to Editor)
- * Hays H, Casavant M, **Jolliff H**. Not Just for Elementary School: A Field Trip and a New Antidote Solidify Trainees' Knowledge of Amatoxin Poisoning. *Clinical Toxicology* (2012) 50(7):659.
- * Hays H, Casavant M, **Jolliff H**. 800 Pebbles in a Stream: Whole Bowel Irrigation and Colonoscopy for Staggered Lead Shot Ingestion. *Clinical Toxicology* (2012) 50(7):661.
- * **Jolliff HA**, Fletcher E, Roberts K, Baker SD, McKenzie L. Pediatric Hydrocarbon-Related Injuries in the United States: 2000-2009. *Pediatrics* published online:doi: 10.1542/peds.2013.3913 and *Pediatrics* 2013; 131(6):1139-47.
- * Huffman M, McCaughey J, Hays H, Jenkins J, Clifton W, Baker D, **Jolliff H**. Lisdexamfetamine (Vyvanse) exposure in children 5 years of age and under: stay or go? Is a trip to the emergency department necessary? *Clinical Toxicology* (2013), 51, 590.

- * Huffman M, McCaughey J, Hays H, Jenkins J, Clifton W, Baker D, **Jolliff H.** Lisdexamfetamine (Vyvanse) exposure in children 5 years of age and under: stay or go? Is a trip to the emergency department necessary? Poster presentation at the North American Congress of Clinical Toxicology. October 2013. Atlanta, GA
- * **Jolliff H**, Holmes C, Holmes K, Clifton W, Jenkins J. "Bath Salts" abuse: A poison center study of the clinical effects and outcomes. *Clinical Toxicology* (2013), 51, 678.
- * **Jolliff H**, Holmes C, Holmes K, Clifton W, Jenkins J. "Bath Salts" abuse: A poison center study of the clinical effects and outcomes. Poster presentation at the North American Congress of Clinical Toxicology. October 2013. Atlanta, GA
- * **Jolliff H**, Keyes J, Magers J, Huffman M. "Bath Salts" toxicity and withdrawal in a newborn. *Clinical Toxicology* (2013), 51, 679.
- * **Jolliff H**, Keyes J, Magers J, Huffman M. "Bath Salts" toxicity and withdrawal in a newborn. Poster presentation at the North American Congress of Clinical Toxicology. October 2013. Atlanta, GA.
- * Pacitti A, Rossi T, **Jolliff H**. Never trust a drug dealer: a rare cause of cutaneous necrosis. Poster presentation at the American College of Osteopathic Emergency Medicine's Spring Seminar. April, 2015. Ft. Lauderdale, FL.
- * **Jolliff HA**, Lloyd C, Robinson E, Price R, Logan B. Clonazolam: A New Synthetic Drug of Abuse. Poster presentation at the North American Congress of Clinical Toxicology. September 2016. Boston, MA
- * Friscia M, **Jolliff HA**, Logan BK. Toxicological Confirmation of Intoxications Involving the Designer Benzodiazepine Clonazolam. Abstract presentation at the Society of Forensic Toxicology Conference. October 2016. Dallas, TX.
- * Barfuss-Walter A, Matthews R, **Jolliff H**. The Accuracy of Non-invasive Pulse Carbon Monoxide Oximetry versus Standard Venous Blood Gas. Poster presentation at the Ohio Osteopathic Symposium. April 2017. Columbus, OH
- * **Jolliff HA**. Isopropyl Alcohol. In *Critical Care Toxicology: Diagnosis and Management of the Critically Poisoned Patient, 2nd Edition*. J Brent, ed. New York: Springer References. 2017.
- * Leubitz A, **Jolliff HA**, Spiller H, Casavant MJ. Medical, Political and Economic Impacts of Medical Marijuana in Children. Poster presentation at the American College of Osteopathic Emergency Medicine's Scientific Assembly. Denver, CO. November 2017.
- * Culley R, **Jolliff HA**. Alcohol Withdrawal. In "Bouncebacks. Critical Care." Weinstock M ed. Submitted for publication May 2018.
- * Leubitz A, **Jolliff HA**, Spiller H, Casavant MJ. The Effect of Legalized Marijuana on Accidental Ingestions in Children: A Retrospective Review. Accepted to Pediatric Emergency Care. August 2018
- * **Jolliff HA**. Clonazolam-A New Synthetic Drug of Abuse In "Ketha and Garg: Toxicology Cases for the Clinical and Forensic Laboratory." Submitted for publication January 2019.
- * Comp G, Duke C, **Jolliff HA**. Wilderness Toxins: Can You Identify the Poison? EM Resident. (2019). <https://www.emra.org/emresident/issue-page-folder/latest-articles/18135>

Studies and Publications in Progress

- * **Jolliff HA**, Russell J, Thomas T. Diphenhydramine Toxicity Treated with Lipid Emulsion Therapy.
- * **Jolliff HA**, et al. The Value of Serum Bicarbonate in the Diagnosis of Ethylene Glycol Toxicity. A Systematic Review.
- * Jolliff HA, Poe DM, Goodhue BF. Recovery from Carbon Monoxide Poisoning and Profound Lactic Acidosis Treated without Hyperbaric Oxygen.
- * Spiller H, **Jolliff H**. Analysis of Blood from Recent Heroin Overdose Patients to Determine Drug Content.

Lectures & Presentations

- * Introduction to Toxicology, St. Anthony North Hospital. EMS Review Course. Westminster, CO. 10/1999
- * Street Drugs of Abuse, St. Anthony North Hospital. EMS Review Course. Westminster, CO. 10/1999
- * Introduction to Toxicology. Colorado Mountain College. EMS Review Course. Breckenridge, CO. 5/2000
- * Street Drugs of Abuse. Colorado Mountain College. EMS Review Course. Breckenridge, CO. 5/2000
- * Anticoagulant Toxicity, Denver Health Medical Center. Emergency Medicine Residency Grand Rounds. Denver, CO. 6/2000
- * Can the Diagnosis of Ethylene Glycol Toxicity Be Made Without Serum Ethylene Glycol and Osmolality Values? A Systematic Review. Rocky Mountain Trauma and Emergency Medicine Conference Research Forum. Steamboat, CO. 7/2000
- * Beta-Blocker and Calcium Channel Blocker Overdose Management, American College of Osteopathic Emergency Physicians (ACOEP) Toxicology Review Course. Colorado Springs, CO. 8/2000
- * Toxic Alcohols. ACOEP Toxicology Review Course. Colorado Springs, CO. 8/2000
- * Toxicology Journal Articles Review. ACOEP Toxicology Review Course. Colorado Springs, CO. 8/2000
- * Cardiac Medication Toxicity, Denver Health Medical Center. Emergency Medicine Residency Grand Rounds. Denver, CO. 9/2000
- * Ethylene Glycol Toxicity and Serum Bicarbonate. Poster presentation. North American Congress of Clinical Toxicology, Tucson, AZ. 9/2000
- * Introduction to the Poisoned Patient. Denver Health Medical Center. Emergency Medicine Residency Grand Rounds. Denver, CO. 11/2000
- * Ethylene Glycol Toxicity: Evaluation and Management. University of California at Davis Department of Emergency Medicine Grand Rounds. Davis, CA. 12/2000
- * Medical Toxicology: Antidote Update. Idaho State Pharmacy Association. Boise, ID. 3/2001
- * Common Poisonings. Eastern Idaho Regional Medical Center. Department of Emergency Medicine Grand Rounds. Idaho Falls, ID. 3/2001
- * Wilderness Toxicology. University of Colorado Health Sciences Center. Department of

Emergency Medicine Grand Rounds. Denver, CO. 4/2001

- * The Value of Serum Bicarbonate in the Diagnosis of Ethylene Glycol Toxicity. A Systematic Review. Platform presentation. European Association of Poisons Centres and Clinical Toxicologists XXI International Congress. Barcelona, Spain. 5/2001.
- * Bradycardia, Hypotension, and Tinnitus After Accidental Oxcarbazepine Overdose. Poster presentation. European Association of Poisons Centres and Clinical Toxicologists XXI International Congress. Barcelona, Spain. 5/2001.
- * Acetaminophen Toxicity: Case Studies. Denver Health Medical Center. Emergency Medicine Residency Grand Rounds. Denver, CO. 6/2001.
- * The Toxic Alcohols. Rocky Mountain Poison and Drug Center. Medical Toxicology Fellowship Orientation Lecture Series. Denver, CO. 7/2001
- * Domestic Preparedness: Chemical and Biological Mass Casualties Weapons. Grant Medical Center. Department of Emergency Medicine Grand Rounds. Columbus, OH. 11/2001
- * Acetaminophen: New Ideas on an Old Toxin. Doctor's Hospital-Ohio University College of Osteopathic Medicine. Emergency Medicine R-PAC Lecture. Columbus, OH. 5/2002
- * Introduction to the Poisoned Patient. Grant Medical Center. Family Practice Residency Grand Rounds. Columbus, OH. 7/2002
- * New Drugs of Abuse. ACOEP New Frontiers in Toxicology Review Course. Chicago, IL. 8/2002
- * Toxicology and the HIV Patient. ACOEP New Frontiers in Toxicology Review Course. Chicago, IL. 8/2002
- * Evidence Based Toxicology. ACOEP New Frontiers in Toxicology Review Course. Chicago, IL. 8/2002
- * Iatrogenic Emergency Department Toxicology: How We Poison Our Own Patients. ACOEP New Frontiers in Toxicology Review Course. Chicago, IL. 8/2002
- * Toxicology: Tricyclic Antidepressant Overdoses. Grant Medical Center. Family Practice Residency Grand Rounds. Columbus, OH. 8/2002
- * Toxicology 101: Approach to the Poisoned Patient. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 1/2003
- * An Introduction to Toxicology. Ohio University College of Osteopathic Medicine. Department of Internal Medicine Grand Rounds. Columbus, OH. 2/2003
- * Cyclic Antidepressant Toxicity. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Morbidity and Mortality Conference. Columbus, OH. 5/2003
- * Smallpox: A Bio-Terrorism Update on Disease and Vaccination. Bio-Terrorism for Non-Military Physicians Conference. Doctors Hospital-OhioHealth. Columbus, OH. 6/2003
- * Operation TOPOFF: The Biological Attack on Denver. Bio-Terrorism for Non-Military Physicians Conference. Doctors Hospital-OhioHealth. Columbus, OH. 6/2003
- * Cyclic Antidepressant Toxicity. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 7/2003
- * Salicylate Toxicity: Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 8/2003
- * Acetaminophen Toxicity: Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 9/2003
- * Cardiac Drug Toxicity: Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 10/2003
- * Appendicitis and Computerized Tomography in the Emergency Department. OhioHealth-

Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 10/2003

- * Serotonin Syndrome. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Morbidity and Mortality Conference. Columbus, OH. 10/2003
- * Carbon Monoxide and Cyanide Toxicity: Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 11/2003
- * Acetaminophen and the Alcoholic Patient. Doctors Hospital 22nd Annual Alumni Reunion Lecture Series. Columbus, OH. 12/2003
- * Drugs of Abuse. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 12/2003
- * Toxic Alcohols. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 1/2004
- * Toxicity of Psychiatric Drugs. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 2/2004
- * Heavy Metal Toxicity. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 3/2004
- * Toxic Envenomations. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 4/2004
- * Iatrogenic Emergency Department Toxicology: How We Poison Our Own Patients. Doctors Hospital/OUCOM Emergency Medicine R-PAC Lecture. Columbus, OH. 4/2004
- * Evidence Based Toxicology Update. Doctor's Hospital/OUCOM Emergency Medicine R-PAC Lecture. Columbus, OH. 4/2004.
- * Organophosphate Toxicity. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 5/2004
- * Mushroom Toxicity. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 5/2004
- * I Am Being Sued! Now What? Medico-legal Issues and Emergency Medicine: Pitfalls and Pearls. OhioHealth-Doctors Hospital. Columbus, OH. 5/2004
- * Caustics Toxicity. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 6/2004
- * Fluoride Toxicity. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 6/2004
- * Hydrocarbon Toxicity. Ohio University College of Osteopathic Medicine. Department of Emergency Medicine Grand Rounds. Columbus, OH. 6/2004
- * Introduction to Toxicology: Approach to the Poisoned Patient. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 8/2004
- * Iatrogenic ED Toxicology-How We Poison Our Patients. Emergency Toxicology Boot Camp Course. OhioHealth-Doctors Hospital. Columbus, OH. 8/2004
- * Tox Boners. Emergency Toxicology Boot Camp Course. OhioHealth-Doctors Hospital. Columbus, OH. 8/2004
- * Case Study Review. Emergency Toxicology Boot Camp Course. OhioHealth-Doctors Hospital. Columbus, OH. 8/2004
- * Evidence Based Toxicology Review. Emergency Toxicology Boot Camp Course. OhioHealth-Doctors Hospital. Columbus, OH. 8/2004
- * New Drugs of Abuse – Update 2004. Emergency Toxicology Boot Camp Course. OhioHealth-Doctors Hospital. Columbus, OH. 8/2004

- * Everything You Wanted to Know About Toxicology in 15 Minutes, Part 1. Emergency Toxicology Boot Camp Course. OhioHealth-Doctors Hospital. Columbus, OH. 8/2004
- * Toxicology of the HIV Patient. Emergency Toxicology Boot Camp Course. OhioHealth-Doctors Hospital. Columbus, OH. 8/2004
- * Everything You Wanted to Know About Toxicology in 15 Minutes, Part 2. Emergency Toxicology Boot Camp Course. OhioHealth-Doctors Hospital. Columbus, OH. 8/2004
- * Acetaminophen Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 9/2004
- * Adverse Drug Events and Interactions in Primary Care. Family Practice Potpourri Course. OhioHealth-Doctors Hospital. Columbus, OH. 9/2004
- * Salicylate Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 10/2004
- * Cardiotropic Drug Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 11/2004
- * Carbon Monoxide and Cyanide Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 12/2004.
- * Toxic Alcohols and Diabetic Medication Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 1/2005.
- * Toxicology 101: A General Approach to the Poisoned Patient. ACOEP 2005 COLA Essentials Course. Marco Island, FL. 2/2005
- * Toxic Alcohols. ACOEP 2005 COLA Essentials Course. Marco Island, FL. 2/2005
- * The Toxicology of AIDS and HIV Drugs. ACOEP 2005 COLA Essentials Course. Marco Island, FL. 2/2005
- * OTC Analgesics: Acetaminophen, Aspirin, and NSAIDS. ACOEP 2005 COLA Essentials Course. Marco Island, FL. 2/2005
- * The Toxicity of Psychiatric Drugs. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 2/2005
- * Drug of Abuse Update. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 3/2005
- * Toxicology in the News. Ohio University College of Osteopathic Medicine, Emergency Medicine R-PAC. OhioHealth-Doctors Hospital. Columbus, OH. 3/2005
- * Toxic Envenomations. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 4/2005
- * Heavy Metal Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Grand Rounds. Columbus, OH. 5/2005
- * High Risk Toxicology: Major Problems of Common Poisonings. Emergency Medicine: Managing the High-Risk Patient Conference. OhioHealth-Doctors Hospital Department of Emergency Medicine. Columbus, OH. 6/2005
- * Toxicology 101: Acetaminophen. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 8/2005

- * Toxicology 101: Salicylates. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 9/2005
- * Toxicology 101: Cardiovascular Drug Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 10/2005
- * Intravenous NAC. Fall 2005 Midwest Toxicology Conference. Columbus Children's Hospital/Central Ohio Poison Center. Columbus, OH. 11/2005.
- * Toxicology 101: Carbon Monoxide and Cyanide Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 11/2005.
- * Toxicology 101: Psych Drugs. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 12/2005
- * Toxicology 101: Toxic Alcohols. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 1/2006
- * Toxicology 101: Oral Hypoglycemic Drugs. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 1/2006
- * Toxicology 101: Drugs of Abuse. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 2/2006
- * Toxicology 101: Heavy Metal Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 3/2006
- * Introduction to Toxicology: An Approach to the Poisoned Patient. Ohio University College of Osteopathic Medicine, Emergency Medicine R-PAC Educational Day. OhioHealth-Doctors Hospital. Columbus, OH. 3/2006
- * High Risk Toxicology Cases. Ohio University College of Osteopathic Medicine, Emergency Medicine R-PAC Educational Day. OhioHealth-Doctors Hospital. Columbus, OH. 3/2006
- * Toxicology 101: Snakes and Spiders. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 4/2006
- * Toxicology 101: Mushrooms and Plants. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 5/2006
- * I'm Being Sued! Now What? Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 5/2006
- * Toxicology 101: Insecticides, Caustics, and Hydrocarbons. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 6/2006
- * Toxicology 101: An Approach to the Poisoned Patient. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident

Lecture Series. Columbus, OH. 8/2006

- * Methanol Poisoning. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department Internal Medicine Morning Report. Columbus, OH. 8/2006
- * Toxicology 101: Acetaminophen Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 9/2006
- * Toxicology 101: Salicylate Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 10/2006
- * Toxicology 101: Cardiovascular Medication Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 11/2006
- * Carbon Monoxide and Cyanide Toxicity. Ohio University College of Osteopathic Medicine, Emergency Medicine R-PAC Educational Day. Ohio University-Pickerington Campus. Pickerington, OH. 3/2007
- * Evidence Based Toxicology Review. Ohio University College of Osteopathic Medicine, Emergency Medicine R-PAC Educational Day. Ohio University-Pickerington Campus. Pickerington, OH. 3/2007
- * Acetaminophen Toxicity. 9th Annual Michigan State University Emergency Medicine Conference: Toxicology. Lansing, Michigan. 4/2007.
- * Rocky Mountain High: Illness Associated with High Altitudes. Ohio Health-Doctors Hospital Department of Emergency Medicine. Columbus, OH. 6/2007
- * Snakes and Spiders, Oh My! Management of the Envenomated Patient. Environmental Emergencies Conference. Ohio Health-Doctors Hospital Department of Emergency Medicine. Environmental Emergencies. Columbus, OH. 6/2007
- * Acetaminophen Toxicity. New Frontiers in Toxicology Conference. American College of Osteopathic Emergency Physicians. Cleveland, OH. 8/2007
- * Toxicology Journal Article Review. New Frontiers in Toxicology Conference. American College of Osteopathic Emergency Physicians. Cleveland, OH. 8/2007
- * Venomous Snakes and Spiders of the United States. New Frontiers in Toxicology Conference. American College of Osteopathic Emergency Physicians. Cleveland, OH. 8/2007
- * Toxic Alcohols. New Frontiers in Toxicology Conference. American College of Osteopathic Emergency Physicians. Cleveland, OH. 8/2007
- * Tox 101: An Introduction to the Poisoned Patient. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 9/2007
- * Tox 101: Acetaminophen Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 10/2007
- * Tox 101: Salicylate Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 11/2007
- * Tox 101: NSAID Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 12/2007

- * Tox 101: Inhaled Toxins. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 1/2008
- * Toxic Envenomations. Ohio University College of Osteopathic Medicine. Emergency Medicine RPAC Educational Day. Columbus, OH. 1/2008
- * Tox 101: Toxic Alcohols. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 2/2008
- * Chronic Acetaminophen Toxicity. Central Ohio Poison Center. Nationwide Children's Hospital. Columbus, OH. 2/2008.
- * Tox 101: Cardiotropic Medications. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 3/2008
- * Toxicology in the News: Risk Assessment and Communication. Ohio University College of Osteopathic Medicine. Emergency Medicine RPAC Educational Day. Columbus, OH. 3/2008
- * Tox 101: Drugs of Abuse. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 4/2008
- * Tox 101: Psychiatric Medications. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 5/2008
- * Adverse Drug Reactions. Tox 101: Primary Care Toxicology Conference. Ohio Health-Doctors Hospital Department of Emergency Medicine. Columbus, OH. 5/2008
- * Toxicology in the News. Tox 101: Primary Care Toxicology Conference. Ohio Health-Doctors Hospital Department of Emergency Medicine. Columbus, OH. 5/2008
- * Tox 101: Heavy Metals. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 6/2008
- * Analgesic Overdose. Delta Regional Medical Center. Grand Rounds. Greenville, MS. 8/2008
- * Tox 101: Introduction to the Poisoned Patient. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 8/2008
- * Tox 101: Caustics and Hydrocarbons. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 9/2008
- * Analgesic Overdose. Cleveland Clinic. Grand Rounds. Miami, FL. 9/2008
- * Tox 101: Anticholinergics. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 10/2008
- * Tox 101: Theophylline. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 10/2008
- * Analgesic Overdose. Euclid Hospital-Cleveland Clinic. Grand Rounds. Euclid, OH. 10/2008

- * Tox 101: Pesticide Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 11/2008
- * Acetaminophen Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital. Medical Student Didactics. Columbus, OH. 11/2008
- * Carbon Monoxide and Cyanide Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital. Medical Student Didactics. Columbus, OH. 11/2008
- * Tox 101: HazMat. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 12/2008
- * Tox 101: Radiation Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 1/2009
- * Analgesic Overdose. Madison County Hospital. Grand Rounds. London, OH. 2/2009
- * Analgesic Overdose. Heritage Valley Health System. Grand Rounds. Beaver, PA 2/2009
- * Tox 101: Hypoglycemics. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 2/2009
- * Tox 101: Vitamin and Antimicrobial Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 2/2009
- * Tox 101: Anticonvulsant Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 3/2009
- * Toxicology Literature Update 2009. Ohio University College of Osteopathic Medicine. Emergency Medicine RPAC Educational Day. Columbus, OH. 3/2009
- * Toxicology of Anti-seizure Medications. Ohio University College of Osteopathic Medicine. Emergency Medicine RPAC Educational Day. Columbus, OH. 3/2009
- * Analgesic Overdose. O'Bleness Memorial Hospital. Grand Rounds. Athens, OH. 3/2009
- * Tox 101: Acetaminophen Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 4/2009
- * Analgesic Overdose. Atrium Medical Center. Grand Rounds. Middletown, OH. 4/2009
- * Critical Care Toxicology Update. Critical Topics in Emergency Medicine Conference. OhioHealth-Doctors Hospital. Dublin, OH. 5/2009
- * Tox 101: Salicylate Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 5/2009
- * Tox 101: Cardiotropic Medication Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 6/2009
- * Analgesic Overdose. Licking Memorial Hospital. Grand Rounds. Newark, OH. 6/2009.
- * Analgesic Overdose. Foundations for Living. Education Conference. Mansfield, OH. 8/2009
- * Tox 101: An Introduction to the Poisoned Patient. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident

- Lecture Series. Columbus, OH. 8/2009
- * Analgesic Overdose. Department of Internal Medicine-Grand Rounds. Bethesda North Hospital. Cincinnati, OH. 8/2009
- * Pediatric Toxidromes. Department of Pediatrics-Grand Rounds. Nationwide Children's Hospital. Columbus, OH. 8/2009
- * Analgesic Overdose. Department of Family Medicine-Grand Rounds. Bethesda-Genesis Medical Center. Zanesville, OH. 9/2009
- * Tox 101: Toxidromes. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Medical Student Lecture Series. Columbus, OH. 9/2009
- * Tox 101: Anticholinergic Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 9/2009
- * Tox 101: Inhaled Toxins. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 10/2009
- * Analgesic Toxicity. PHARM 694-Clinical Toxicology. The Ohio State University College of Pharmacy. Columbus, OH. 10/2009
- * Anticonvulsant Toxicity. PHARM 694-Clinical Toxicology. The Ohio State University College of Pharmacy. Columbus, OH. 10/2009
- * Antipsychotic Toxicity. PHARM 694-Clinical Toxicology. The Ohio State University College of Pharmacy. Columbus, OH. 10/2009
- * Tox 101: Psychiatric Drugs. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 11/2009
- * Tox 101: Drugs of Abuse. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 12/2009
- * Tox 101: Toxic Alcohols. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 1/2010
- * Addiction Medicine: A Toxicologist's Perspective. University of Connecticut School of Medicine. Hartford Hospital Department of Emergency Medicine Grand Rounds. Hartford, CT. 1/2010
- * Tox 101: Caustics and Hydrocarbons. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 2/2010
- * Tox 101: Pesticides and Herbicides. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 3/2010
- * Envenomations. Ohio University College of Osteopathic Medicine. Emergency Medicine RPAC Educational Day. Columbus, OH. 3/2010
- * Toxicology Literature Update 2010. Ohio University College of Osteopathic Medicine. Emergency Medicine RPAC Educational Day. Columbus, OH. 3/2010.
- * Tox 101: Diabetic Medications. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 4/2010

- * Adolescent Drug Abuse and Detox. Nationwide Children's Hospital Psychiatry Fellows Lecture Series. Columbus, OH. 4/2010
- * Over-the-counter Analgesic Toxicity: Exploring the FDA's Safe Use Initiative. Alliance Hospital. Alliance, OH. 5/2010
- * Prescription Drug Abuse in Ohio. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 5/2010
- * High Risk Toxicology. High Risk Topics in Emergency Medicine Conference. OhioHealth-Doctors Hospital. Dublin, OH. 5/2010
- * Tox 101: Ant-seizure Medications. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 6/2010
- * Over-the-counter Analgesic Toxicity: Exploring the FDA's Safe Use Initiative. Holzer Medical Center. Gallipolis, OH. 7/2010
- * Pediatric Toxicodromes. Nationwide Children's Hospital Pediatric Residency Lecture Series. Columbus, OH. 7/2010
- * Over-the-counter Analgesic Toxicity: Exploring the FDA's Safe Use Initiative. Licking Memorial Hospital. Newark, OH. 8/2010
- * Tox 101: An Introduction to the Poisoned Patient. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 6/2010
- * Tox 101: Acetaminophen Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 9/2010
- * The Role of the Medical Toxicologist on the Addiction Medicine Service. Fellows in Training Luncheon. NACCT. Denver, CO 10/2010
- * Analgesic Toxicity. PHARM 694-Clinical Toxicology. The Ohio State University College of Pharmacy. Columbus, OH. 10/2010
- * Anticonvulsant Toxicity. PHARM 694-Clinical Toxicology. The Ohio State University College of Pharmacy. Columbus, OH. 10/2010
- * Tox 101: Salicylate Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 10/2010
- * Tox 101: Inhaled Toxins. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 11/2010
- * Antipsychotic Toxicity. PHARM 694-Clinical Toxicology. The Ohio State University College of Pharmacy. Columbus, OH. 11/2010
- * Heavy Metal Toxicity. PHARM 694-Clinical Toxicology. The Ohio State University College of Pharmacy. Columbus, OH. 11/2010
- * Tox 101: Toxic Alcohols. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 12/2010
- * Tox 101: An Introduction to the Poisoned Patient. Ohio University College of Osteopathic Medicine. Kettering-Grandview Hospital. Department of Emergency Medicine Resident

Lecture Series. Dayton, OH. 12/2010

- * Tox 101: Acetaminophen Toxicity. Ohio University College of Osteopathic Medicine. Kettering-Grandview Hospital. Department of Emergency Medicine Resident Lecture Series. Dayton, OH. 12/2010
- * Drugs of Abuse Update. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital; Hospital. Department of Family Medicine Resident Lecture Series. Dayton, OH. 1/2011
- * Tox 101: Cardiotropic Medication Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 1/2011
- * Pediatric Hydrocarbon Ingestions. Emergency Medicine Fellows Grand Rounds. Nationwide Children's Hospital. Columbus, OH. 1/2011
- * Tox 101: Salicylate Toxicity. Ohio University College of Osteopathic Medicine. Kettering-Grandview Hospital. Department of Emergency Medicine Resident Lecture Series. Dayton, OH. 2/2011
- * Tox 101: Inhaled Toxins. Ohio University College of Osteopathic Medicine. Kettering-Grandview Hospital. Department of Emergency Medicine Resident Lecture Series. Dayton, OH. 2/2011
- * Tox 101: Drugs of Abuse. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 2/2011
- * Tox 101: Pesticide Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 3/2011
- * Newer Drugs of Abuse Update. Ohio University College of Osteopathic Medicine. Emergency Medicine RPAC Education Day. Columbus, OH. 3/2011
- * Toxicology Literature Review. Ohio University College of Osteopathic Medicine. Emergency Medicine RPAC Educational Day. Columbus, OH. 3/2011
- * Tox 101: Heavy Metal Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 4/2011
- * Tox 101: Psychiatric Drug Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 5/2011
- * Critical Care Toxicology. The Ohio State University. Critical Care Grand Rounds. Columbus, OH. 5/2011
- * Drugs of Abuse and Traumatic Injury. Trauma and Critical Care Update 2011 Conference. Miami Valley Hospital. Dayton, OH. 5/2011
- * Drugs of Abuse and Pediatric Trauma. Emergency Medicine Fellows Grand Rounds. Nationwide Children's Hospital. Columbus, OH. 5/2011
- * Tox 101: Toxic Plants. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 6/2011
- * "I'm Being Sued! Now What?" Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 6/2011

- * Pediatric Drug and Alcohol Withdrawal. Pediatric Acute Care Series. Nationwide Children's Hospital. Columbus, OH. 7/2011
- * Pediatric Toxidromes. Department of Pediatrics Grand Rounds. Nationwide Children's Hospital. Columbus, OH. 7/2011
- * Introduction to the Poisoned Patient. OSU Medical Toxicology Fellowship Core Lecture Series. Columbus, OH. 8/2011
- * Acetaminophen Toxicity. OSU Medical Toxicology Fellowship Core Lecture Series. Columbus, OH. 8/2011
- * Toxic Alcohols. OSU Medical Toxicology Fellowship Core Lecture Series. Columbus, OH. 8/2011
- * Toxicity of Psychiatric Medications. OSU Medical Toxicology Fellowship Core Lecture Series. Columbus, OH. 8/2011
- * Toxicity of Anti-seizure Medications. OSU Medical Toxicology Fellowship Core Lecture Series. Columbus, OH. 8/2011
- * Carbon Monoxide and Cyanide Toxicity. OSU Medical Toxicology Fellowship Core Lecture Series. Columbus, OH. 8/2011
- * Envenomations. OSU Medical Toxicology Fellowship Core Lecture Series. Columbus, OH. 8/2011
- * Introduction to the Poisoned Patient. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 8/2011
- * The Toxicity of Caustics and Hydrocarbons. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 9/2011
- * Drugs of Abuse Update for Primary Care Physicians. Family Medicine Update. Doctors Hospital-OhioHealth. Columbus, OH. 9/2011
- * Anticholinergic Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 10/2011
- * Drugs of Abuse Update 2011. Hospital Grand Rounds. Doctors Hospital-OhioHealth. Columbus, OH. 10/2011
- * Drugs of Abuse Update 2011. Hospital Grand Rounds. Genesis Health System. Zanesville, OH. 10/2011
- * Synthetic Drugs of Abuse. Northwestern Ohio Osteopathic Association Annual CME Conference. Sandusky, OH. 11/2011
- * Toxicity of Mushrooms. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 11/2011
- * Drugs of Abuse Update 2011. Hospital Grand Rounds. Doctors Hospital-OhioHealth. Columbus, OH. 11/2011
- * Tox 101: Drugs of Abuse. Ohio University College of Osteopathic Medicine. Kettering-Grandview Hospital. Department of Emergency Medicine Resident Lecture Series. Dayton, OH. 2/2011
- * Hazardous Materials Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus,

OH. 12/2011

- * Newer Drugs of Abuse. Pediatric Anesthesia Grand Rounds. Nationwide Children's Hospital. Columbus, OH. 12/2011
- * Acetaminophen Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 1/2012
- * Salicylate and NSAID Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 2/2012
- * Tox 101: Hydrocarbons and Caustics. Ohio University College of Osteopathic Medicine. Kettering-Grandview Hospital. Department of Emergency Medicine Resident Lecture Series. Dayton, OH. 2/2012
- * Tox 101: Heavy Metals. Ohio University College of Osteopathic Medicine. Kettering-Grandview Hospital. Department of Emergency Medicine Resident Lecture Series. Dayton, OH. 2/2012
- * Cardiotropic Medication Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 3/2012
- * Difficult Conversations with Drug Seeking Patients. American College of Medical Toxicology's Spring Conference Pre-symposium. San Diego, CA. 3/2012
- * The Toxicity of Drugs of Abuse. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 4/2012
- * Psychiatric Medication Toxicity. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 5/2012
- * The Toxicity of Pesticides. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 6/2012
- * Toxic Alcohols. The Ohio State University Department of Emergency Medicine-Medical Toxicology Fellowship Program Lecture Series. Columbus, OH. 7/2012
- * Diabetic Medication Toxicity. The Ohio State University Department of Emergency Medicine-Medical Toxicology Fellowship Program Lecture Series. Columbus, OH. 7/2012
- * Psychiatric Medication Toxicity. The Ohio State University Department of Emergency Medicine-Medical Toxicology Fellowship Program Lecture Series. Columbus, OH. 7/2012
- * The Toxicity of Envenomations. The Ohio State University Department of Emergency Medicine-Medical Toxicology Fellowship Program Lecture Series. Columbus, OH. 7/2012
- * Heavy Metal Toxicity. The Ohio State University Department of Emergency Medicine-Medical Toxicology Fellowship Program Lecture Series. Columbus, OH. 7/2012
- * Antiepileptic Medication Toxicity. The Ohio State University Department of Emergency Medicine-Medical Toxicology Fellowship Program Lecture Series. Columbus, OH. 7/2012
- * The Toxicity of Acetaminophen. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 9/2012
- * Addiction and Treatment: A Toxicologist's Perspective. American College of Medical Toxicology Pre-symposium at the North American Congress of Clinical Toxicology. Las

Vegas, NV. 10/2012

- * Newer Drugs of Abuse. American College of Osteopathic Emergency Physicians Scientific Assembly. Denver, CO. 10/2012
- * Toxicology for the Non-Toxicologist. American College of Osteopathic Emergency Physicians Scientific Assembly. Denver, CO. 10/2012
- * Inhaled Toxins. EMS Education Week. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine. Columbus, OH. 11/2012
- * Laundry Detergent Toxicity. Central Ohio Trauma System's Pre-Hospital Committee. Emergency Management Agency. Columbus, OH. 11/2012
- * Toxic Alcohols. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 12/2012
- * Toxicity of Cardiotropic Medications. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 1/2013
- * Toxicity of Pesticides. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 2/2013
- * Newer Drugs of Abuse. Central Ohio Society of Health Systems Pharmacists. Columbus, OH. 3/2013
- * Update on Drugs of Abuse. Centers of Osteopathic Residency Education (CORE)-Ohio University Heritage College of Osteopathic Medicine. Emergency Medicine RPAC Education Day. Columbus, OH. 3/2012
- * Toxicology for Emergency Medicine Physicians. Centers of Osteopathic Residency Education (CORE)-Ohio University Heritage College of Osteopathic Medicine. Emergency Medicine RPAC Education Day. Columbus, OH. 3/2012
- * Medical Toxicology Literature Update. Centers of Osteopathic Residency Education (CORE)-Ohio University Heritage College of Osteopathic Medicine. Emergency Medicine RPAC Education Day. Columbus, OH. 3/2012
- * Toxicity of Heavy Metals. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 4/2013
- * Household Cleaning Products-Related Injuries, Spray Bottles and Treatment. Co-lecture with Lara McKenzie, PhD. Bench to Outcome Seminar Series (BOSS). The Research Institute of Nationwide Children's Hospital. Columbus, OH. 5/2013
- * Toxic Envenomations. Grand Rounds. CaroMont Regional Medical Center/Carolinas Medical Center. Charlotte, NC. 6/2013
- * Toxicity of Common Plants. Ohio University College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 6/2013
- * Introduction to the Poisoned Patient. Ohio University Heritage College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 8/2013
- * Acetaminophen Toxicity. Ohio University Heritage College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 9/2013

- * Heavy Metal Toxicity: A Primary Care Update. Family Medicine Update 2013. The Heritage Center for Osteopathic Medical Education. Doctors Hospital. Columbus, OH. 9/2013
- * Salicylate Toxicity. Ohio University Heritage College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 10/2013
- * Toxic Alcohols. Ohio University Heritage College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 11/2013
- * Drugs of Abuse Update 2013. Parkview Regional Medical Center-Department of Emergency Medicine Continuing Medical Education Lecture Series. Ft. Wayne, IN. 11/2013
- * Toxicology for Emergency Medicine Physicians. Parkview Regional Medical Center-Department of Emergency Medicine Continuing Medical Education Lecture Series. Ft. Wayne, IN. 11/2013
- * CO/CN/HS Toxicity. Ohio University Heritage College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 1/2014
- * Introduction to the Poisoned Patient. Toxic Alcohols. Ohio University Heritage College of Osteopathic Medicine. Adena Regional Medical Center. Department of Emergency Medicine Resident Lecture Series. Chillicothe, OH. 2/2014
- * Newer Drugs of Abuse. Ohio University Heritage College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 3/2014
- * The Toxicity of Psychiatric Medications. Ohio University Heritage College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 5/2014
- * Toxic Envenomations. Ohio University Heritage College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 6/2014
- * Acetaminophen Toxicity. Ohio University Heritage College of Osteopathic Medicine. Adena Regional Medical Center. Department of Emergency Medicine Resident Lecture Series. Chillicothe, OH. 7/2014
- * The Initial Approach to the Poisoned Patient. Ohio University Heritage College of Osteopathic Medicine. OhioHealth-Doctors Hospital Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 8/2014
- * Acetaminophen Toxicity. Ohio University Heritage College of Osteopathic Medicine. OhioHealth-Doctors Hospital. Department of Emergency Medicine Resident Lecture Series. Columbus, OH. 9/2014
- * Acetaminophen Toxicity for the Emergency Physician. American College of Osteopathic Emergency Physicians Scientific Assembly. Caesar's Palace. Las Vegas, NV. 10/2014
- * Toxicology Literature Updates. American College of Osteopathic Emergency Physicians Scientific Assembly. Caesar's Palace. Las Vegas, NV. 10/2014
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Activities & Committees

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- * Chair; Clinical Competency Committee. Emergency Medicine Residency. Adena Regional Medical Center. 2015-present
- * American Academy of Clinical Toxicology. Scientific Platform Presentation Judge. 2015
- * North American Congress of Clinical Toxicology. New Orleans, Louisiana. 2014
- * American College of Medical Toxicology Legal and Consultative Committee; 2013-2015
- * American College of Medical Toxicology Addiction Medicine Committee; 2011-2015
- * American College of Medical Toxicology Fellowship Director's Committee; 2011-2013
- * Graduate Medical Education Committee. Nationwide Children's Hospital. Columbus, OH. 2011-2013
- * Graduate Medical Education Committee. The Ohio State University Wexner Medical Center. Columbus, OH. 2011-2013
- * Governor's Cabinet Opiate Action Team. Columbus, OH. 2011-2013
- * Lead and Peer Reviewer of NPDS/AAPCC Fatality Reviews Committee; 2009-2011
- * Ohio Prescription Drug Abuse Task Force; Columbus, OH. 2010
- * Pharmacy and Therapeutics Committee, Doctors Hospital-OhioHealth, Columbus, OH. 2008 – present
- * Central Ohio Trauma System's Regional Hospital Emergency Preparedness Committee; Columbus, OH. 2008-2013
- * Columbus Metropolitan Medical Response System: Radiation Exposure Work Group; Columbus, OH. 2008-2012
- * Columbus Metropolitan Medical Response System: Pharmaceutical Work Group; Columbus, OH. 2008
- * Chair; Emergency Department Pain Committee; OhioHealth-Doctors Hospital; Columbus, OH. 2005
- * Task Force on Ethics, American College of Medical Toxicology; 2004-2006
- * Emergency Department Process Improvement Steering Committee, Doctors Hospital; Columbus, OH. 2004
- * Chair; Emergency Department PYXIS Improvement Project; Doctors Hospital; Columbus, OH. 2004-2006

- * Pharmacy and Therapeutics Committee, Doctors Hospital, Columbus, OH. 2004-2006
- * Operation TOPOFF, Controller, United States Department of Defense, Denver, CO. 2000
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Addendum C:
Ohio Governor's Cabinet Opiate Action Team (GCOAT)
Ohio Guidelines for Emergency and Acute Care Facility
Opioid and Other Controlled Substances (OOCS) Prescribing

Ohio Guidelines for Emergency and Acute Care Facility Opioid and Other Controlled Substances (OOCS) Prescribing

Preface: These guidelines provide a general approach in the prescribing of OOCS. They are not intended to take the place of clinical judgement, which should always be utilized to provide the most appropriate care to meet the unique needs of each patient. These guidelines are a result of the work from the Governor's Cabinet Opiate Action Team (GCOAT) and the workgroup on Opioids and Other Controlled Substances (OOCS).



1. OOCS for acute pain, chronic pain and acute exacerbations of chronic pain will be prescribed in emergency/acute care facilities only when appropriate based on the patient's presenting symptoms, overall condition, clinical examination and risk for addiction.
 - a. Doses of OOCS for routine chronic pain or acute exacerbations of chronic pain will typically NOT be given in injection (IM or IV) form.
 - b. Prescriptions for chronic pain will typically NOT be provided if the patient has either previously presented with the same problem or received an OOCS prescription from another provider within the last month.
 - c. IV Demerol (Meperidine) for acute or chronic pain is discouraged.
2. Emergency medical clinicians will not routinely provide:
 - a. Replacement prescriptions for OOCS that were lost, destroyed or stolen.
 - b. Replacement doses of Suboxone, Subutex or Methadone for patients in a treatment program.
 - c. Long-acting or controlled-release opioids (such as OxyContin®, fentanyl patches, and methadone).
3. Prior to making a final determination regarding whether a patient will be provided a prescription for OOCS, the emergency clinician or facility:
 - a. Should search the Ohio Automated Rx Reporting System (OARRS) database (<https://www.ohiopmp.gov/portal/Default.aspx>) or other prescription monitoring programs, per state rules.
 - b. Reserves the right to request a photo ID to confirm the identity of the patient. If no photo ID is available, the emergency or other acute care facility should photograph the patient for inclusion in the facility medical record.
 - c. Reserves the right to perform a urine drug screen or other drug screening.
4. Emergency/acute care facilities should maintain an updated list of clinics that provide primary care and/or pain management services for patients, as needed.
5. Prior to making a final determination regarding whether a patient will be provided a prescription for an OOCS, the emergency clinician should consider the following options:
 - a. Contact the patient's routine provider who usually prescribes their OOCS.
 - b. Request a consultation from their hospital's palliative or pain service (if available), or an appropriate sub-specialty service.
 - c. Perform case review or case management for patients who frequently visit the emergency/acute care facilities with pain-related complaints.
 - d. Request medical and prescription records from other hospitals, provider's offices, etc.
 - e. Request that the patient sign a pain agreement that outlines the expectations of the emergency clinician with regard to appropriate use of prescriptions for OOCS.
6. Emergency/acute care facilities should use available electronic medical resources to coordinate the care of patients who frequently visit the facility, allowing information exchange between emergency/acute care facilities and other community-care providers.
7. Except in rare circumstances, prescriptions for OOCS should be limited to a three-day supply. Most conditions seen in the emergency/acute care facility should resolve or improve within a few days. Continued pain needs referral to the primary care physician or appropriate specialist for re-evaluation.
8. Each patient leaving the emergency/acute care facility with a prescription for OOCS should be provided with detailed information about the addictive nature of these medications, the potential dangers of misuse and the appropriate storage and disposal of these medications at home. This information may be included in the Discharge Instructions or another handout.
9. Following the medical screening, emergency/acute care facilities should provide a patient handout that reflects the above guidelines and clearly states the facility position regarding the prescribing of opioids and other controlled substances.

(Released April 2012; Updated January 2014)

Addendum D:
Ohio Governor's Cabinet Opiate Action Team (GCOAT)
Ohio Guidelines for the Management of Acute Pain
Outside of Emergency Departments

Ohio Guideline for the Management of Acute Pain Outside of Emergency Departments

Preface: This guideline provides a general approach to the outpatient management of acute pain. It is not intended to take the place of clinician judgement, which should always be utilized to provide the most appropriate care to meet the unique needs of each patient. This guideline is the result of the work from the Governor's Cabinet Opiate Action Team (GCOAT) and the workgroup on Opioids and Other Controlled Substances (OOCS).



Introduction

In 2014, 2,482 individuals in Ohio died from an unintentional opioid-related overdose – more than a four-fold increase in 10 years¹.

Unintentional opioid overdose has become one of the leading causes of injury-related death in Ohio over the past decade. To respond to this challenge, public health and health care leaders have committed to helping healthcare providers better serve their patients with pain, while reducing the potential for overdose and death. As part of the Governor's Cabinet Opiate Action Team (GCOAT), the workgroup on Opioids and Other Controlled Substances (OOCS) was charged with developing guidelines for the safe, appropriate and effective prescribing of self-administered medications for pain. The two previously released guidelines are:

- Ohio Emergency and Acute Care Facility Opioids and Other Controlled Substances Prescribing Guidelines [Released 2012; Revised 2014]
- Guidelines for Prescribing Opioids for the Treatment of Chronic, Non-Terminal Pain 80mg of a Morphine Equivalent Dose (MED) "Trigger Point" [Released 2013]

Purpose

This third guideline is focused on the management of acute pain and the prescribing of self-administered medications for acute pain, delineating a standardized process that includes key checkpoints for the clinician to pause and take additional factors into consideration.

Definition of Acute Pain

For this guideline, acute pain is defined as pain that normally fades with healing, is related to tissue damage and significantly alters a patient's typical function. Acute pain is expected to resolve within days to weeks; pain present at 12 weeks is considered chronic and should be treated accordingly. This guideline may not apply to acute pain resulting from exacerbations of underlying chronic conditions.

Assessment and Diagnosis of Patient Presenting with Pain

For assessing patients presenting with acute pain, in addition to a proper medical history and physical exam, initial considerations should include:

- Location, intensity and severity of the pain and associated symptoms
- Quality of pain e.g. somatic (sharp or stabbing), visceral (ache or pressure) and neuropathic pain (burning, tingling or radiating)²
- Psychological factors, including personal and/or family history of substance use disorder

A specific diagnosis should be made, when appropriate, to facilitate the use of an evidence-based approach to treatment.

Develop a Plan

Upon determining the symptoms fit the definition of acute pain, both the provider and patient should discuss the risks/benefits of both pharmacologic and non-pharmacologic therapy. The provider should educate and develop a treatment plan together with the patient that includes³:

- Measureable goals for the reduction of pain
- Use of both non-pharmacologic and pharmacologic therapies, with a clear path for progression of treatment
- Mutually understood expectations for the degree and the duration of the pain during therapy
- Goal: Improvement of function to baseline or pre-injury status as opposed to complete resolution of pain

Treatment of Acute Pain

While these guidelines provide a pathway for the management of acute pain, not every patient will need each option and care should be individualized.

Non-Pharmacologic Treatment

Non-pharmacologic therapies should be considered as first-line therapy for acute pain unless the natural history of the cause of pain or clinical judgment warrants a different approach. These therapies often reduce pain with fewer side effects and can be used in combination with non-opioid medications to increase likelihood of success. Examples may include, but are not limited to:

- Ice, heat, positioning, bracing, wrapping, splints, stretching and directed exercise often available through physical therapy
- Massage therapy, tactile stimulation, acupuncture/acupressure, chiropractic adjustment, manipulation, and osteopathic neuromuscular care
- Biofeedback and hypnotherapy

Non-Opioid Pharmacologic Treatment

Non-opioid medications should be used with non-pharmacologic therapy. When initiating pharmacologic therapy, patients should be informed on proper use of medication, importance of maintaining other therapies and expectation for duration and degree of symptom improvement. Treatment options, by the quality of pain, are listed below.

Somatic Pain

- Acetaminophen
- Non-steroidal anti-inflammatory drugs (NSAIDS)
- Corticosteroids

Alternatives include the following: gabapentin/pregabalin, skeletal muscle relaxants, serotonin-norepinephrine reuptake inhibitors, selective serotonin reuptake inhibitors and tricyclic antidepressants.

Visceral Pain

- Acetaminophen
- Non-steroidal anti-inflammatory drugs (NSAIDS)
- Corticosteroids

Alternatives include the following: dicyclomine, skeletal muscle relaxants, serotonin-norepinephrine reuptake inhibitors, topical anesthetics and tricyclic antidepressants.

Neuropathic Pain

- Gabapentin/pregabalin
- Serotonin and norepinephrine reuptake inhibitors
- Tricyclic antidepressants

Alternatives include the following: other antiepileptics, baclofen, bupropion, low-concentration capsaicin, selective serotonin reuptake inhibitors and topical lidocaine.

Opioid Pharmacologic Treatment

In general, reserve opioids for acute pain resulting from severe injuries or medical conditions, surgical procedures, or when alternatives (non-opioid options) are ineffective or contraindicated. Short-term opioid therapy may be preferred as a first line therapy in specific circumstances such as the immediate post-operative period. In most cases, opioids should be used as adjuncts to additional therapies, rather than alone.⁴ It is critical that healthcare providers communicate with one another about a patient's care if the patient may be receiving opiate prescriptions from more than one provider to ensure optimum and appropriate pain management. The following are recommendations for the general use of opioids to manage acute pain:

- Appropriate risk screening should be completed (e.g. age, pregnancy, high-risk psychosocial environment, personal or family history of substance use disorder).
- Provide the patient with the least potent opioid to effectively manage pain. A morphine equivalence chart should be used if needed.
- Prescribe the minimum quantity needed with no refills based on each individual patient, rather than a default number of pills.
- Consider checking Ohio Automated Rx Reporting System (OARRS) for all patients who will receive an opiate

prescription. (Note: An OARRS report is required for most prescriptions of seven days or more.)

- Avoid long-acting opioids (e.g. methadone, oxycodone ER, fentanyl).
- Use caution with prescribing opioids with patients on medications causing central nervous system depression (e.g. benzodiazepines and sedative hypnotics) or patients known to use alcohol, as combinations can increase the risk of respiratory depression and death.
- Discuss with the patient a planned wean off opioid therapy, concomitant with reduction or resolution of pain.
- Discuss proper secure storage and disposal of unused medication to reduce risks to the patient and others.
- Remind the patient that it is both unsafe and unlawful to give away or sell opioid medication, including unused or leftover medication.

Pain Reevaluation

Key Checkpoint: Reevaluation of patients who receive opioid therapy for acute pain will be considered if opioid therapy will continue beyond 14 days. This reevaluation may be through an office visit or phone call based on the discretion of the provider.

For patients with persisting pain, providers should reevaluate the initial diagnosis and consider the following:

- Pain characteristics (consider using a standardized tool [e.g. Oswestry Disability Index])
- Treatment methods used
- Reason(s) for continued pain
- Additional management options, including consultation with a specialist

Additional Checkpoint:

For patients with pain unresolved after 6 weeks, providers should repeat an assessment and determine whether treatment should be adjusted. Referral to guidelines on chronic pain management may be helpful at this point, although chronic pain is defined as pain persisting for longer than 12 weeks.

References:

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4. Washington State Agency Medical Directors Group. Interagency Guideline on Prescribing Opiates for Pain Washington State Guidance. June 2015.

Addendum E:
Ohio Governor's Cabinet Opiate Action Team (GCOAT)
Ohio Guidelines for Prescribing Opioids for the Treatment of Chronic,
Non-Terminal Pain 80 mg of a Morphine Equivalent Daily Dose (MED) "Trigger Point"

Ohio Guidelines for Prescribing Opioids for the Treatment of Chronic, Non-Terminal Pain 80 mg of a Morphine Equivalent Daily Dose (MED) "Trigger Point"

Preface: These guidelines address the use of opioids for the treatment of chronic, non-terminal pain. "Chronic pain" means pain that has persisted after reasonable medical efforts have been made to relieve the pain or cure its cause and that has continued, either continuously or episodically, for longer than three continuous months. The guidelines are intended to help health care providers review and assess their approach in the prescribing of opioids. The guidelines are points of reference intended to supplement and not replace the individual prescriber's clinical judgment. The 80 mg MED is the maximum daily dose at which point the prescriber's actions are triggered; however, this 80 mg MED trigger point is not an endorsement by any regulatory body or medical professional to utilize that dose or greater.



Introduction

Recent analysis by the Centers for Disease Control and Prevention (CDC) shows that "patients with mental health and substance use disorders are at increased risk for nonmedical use and overdose from prescription painkillers as well as being prescribed high doses of these drugs." Drug overdose deaths increased for the 11th consecutive year in 2010. Nearly 60% of the deaths involved pharmaceuticals, and opioids were involved in nearly 75%. Researchers also found that drugs prescribed for mental health conditions were involved in over half. These findings appear consistent with research previously published in the *Annals of Internal Medicine* that concluded that "patients receiving higher doses of prescribed opioids are at an increased risk for overdose, which underscores the need for close supervision of these patients" (Dunn, et al., 2010).

Non-Opioid Therapies First

Health care providers are not obligated to use opioids when a favorable risk-benefit balance cannot be documented. Providers should first consider non-pharmacologic and non-opioid therapies. Providers should exercise the same caution with tramadol as with opioids and must take into account the medication's potential for abuse, the possibility the patient will obtain the medication for a nontherapeutic use or distribute it to other persons, and the potential existence of an illicit market for the medication.

Avoid Long-Term and Co-Prescribing

Providers must be vigilant to the wide range of potential adverse effects associated with long-term opioid therapy and misuse of extended-release formulations. That vigilance and detailed attention has to be present from the outset of prescribing and continue for the duration of treatment. Providers should avoid starting a patient on long-term opioid therapy when treating chronic pain. Providers should also avoid prescribing benzodiazepines with opioids as it may increase opioid toxicity, add to sleep apnea risk, and increase risk of overdose deaths and other potential adverse effects.

Press Pause

Providers can further minimize the potential for prescription drug abuse/misuse and help reduce the number of unintentional overdose deaths associated with pain medications by recognizing times to "press pause" in response to certain "trigger points." This pause allows providers to reassess their compliance with accepted and prevailing standards of care. The 80 mg Morphine Equivalent Daily Dose (MED) "trigger point" is one such time.

Ensure Patient Safety

Providers treating chronic, non-terminal pain patients who have received opioids equal to or greater than 80 mg MED for longer than three continuous months should strongly consider doing the following to optimize therapy and help ensure patient safety:

- Reestablish informed consent, including providing the patient with written information on the potential adverse effects of long-term opioid therapy.
- Review the patient's functional status and documentation, including the 4A's of chronic pain treatment
 - Activities of daily living,
 - Adverse effects,
 - Analgesia; and
 - Aberrant behavior
- Review the patient's progress toward treatment objectives for the duration of treatment.
- Utilize OARRS as an additional check on patient compliance.
- Consider a patient pain treatment agreement that may include: more frequent office visits, different treatment options, drug screens, use of one pharmacy, use of one provider for the prescription of pain medications, and consequences for non-compliance with terms of the agreement.
- Reconsider having the patient evaluated by one or more other providers who specialize in the treatment of the area, system, or organ of the body perceived as the source of the pain.

Review Treatment Plan

The 80 MED “trigger point” is an opportunity to review the plan of treatment, the patient’s response to treatment, and any modification to the plan of treatment that is necessary to achieve a favorable risk-benefit balance for the patient’s care. If opioid therapy is continued, further reassessment will be guided by clinical judgment and decision-making consistent with accepted and prevailing standards of care. The “trigger point” also provides an opportunity to further assess addiction risk or mental health concerns, possibly using Screening, Brief Intervention, and Referral to Treatment (SBIRT) tools, including referral to an addiction medicine specialist when appropriate.

For providers treating acute exacerbation of chronic, non-terminal pain, clinical judgment may not trigger the need for using the full array of reassessment tools.

Providers treating patients with acute care conditions in the emergency department or urgent care center should refer to the Ohio Emergency and Acute Care Facility Opioids and Other Controlled Substances Prescribing Guidelines. <http://www.healthy.ohio.gov/ed/guidelines>

Addendum F:
Materials Considered

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Expert Report of Theodore Parran, March 25, 2019.

Expert Report of Katherine Keyes, March. 24, 2019.

Addendum G:
Recent Testimony



**Trial & Deposition Summary
Heath A. Jolliff, DO, FACMT, FACEP, FAAEM
2015-2019**

From 2015-2019, I have provided testimony in the following cases at trial:

1. Charles Hunt, et al. v. City of Cleveland, et al.; Case #: 11-CV-755540; Court of Common Pleas, Cleveland, Ohio; April 20, 2017
2. *State of Ohio vs. Andrew M. McGowan*. Case #: 2017 CR-A-006567. Franklin County Court of Common Pleas. Columbus, Ohio; March 14, 2018

From 2015-2019, I have provided testimony in the following depositions:

1. *Robert Namola v. DAE-IL, USA, Inc.*; Case #: 2012 CV-01587; Court of Common Pleas, Trumbull County, Ohio; March 10, 2015
2. Charles Hunt, et al. v. City of Cleveland, et al.; Case #: 11-CV-755540; Court of Common Pleas, Cleveland, Ohio; April 20, 2017
3. Kathleen Lintelmann v. Locke Peter Keney, MD; Case #: 2016-CV-000108. Douglas County District Court Division 5, Colorado; August 10, 2017
4. *The Estate of Rachel A. Barnes v. John T. Boyd, et al.*; Case #: 3:16-CV-00190-RLM-MGG; United States District Court, Northern District of Indiana, Southbend Division; January 12, 2018